The Veterinary Record.

(*Founded by William Hunting, F.R.C.V.S., 1888.*)

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Ancient Veterinary Practice.

By. A. Shoshan, Class "D," R.V.C., London.

That veterinary surgery was practised prior to the year 2200 B.C. can be proved from the Code of Hammurabi (Amrophel ?—Genesis XIV) which states: "If a veterinarian inflicts a serious wound in an ox or ass, he must pay a sixth of a silver shekel. Should the animal die as a result of the wound, the veterinarian will have to pay a fourth of the animal's cost."

Ezekiel (Fifth Century B.C.) censures the bad shepherds of Israel:—"The diseased have ye not strengthened, neither have ye healed that which was sick, neither have ye bound up that which was broken."

The Talmud, which was compiled about the time of Christ, contains an enormous amount of information regarding ailments and treatment of the human subject. There are, however, quite interesting information and *data* concerning the veterinary profession. These should be of historical interest to the present day practitioner.

The Talmud refers many times to various breeds of domestic animals common in Palestine, Syria, Cyprus and Mesopotamia, since these countries were the only ones known to the civilised world. Of all the domestic animals, the cow has provoked more interest and discussion than any other.

The Talmud gives quite a good description of all the cow's organs, whether in health or otherwise. Any blemish involving skin or hoof was supposed to be a sign of unsoundness. In fact, any bovine or ovine animal showing signs of departure from health was rejected by the priest, who was well acquainted with the obvious diseases attacking such animals, thus fulfilling the Biblical command:—"Blind, or broken, or maimed, or having a wen, or scurvy, or scabbed, ye shall not offer these unto the Lord."

The other domesticated animals have drawn less attention—the least popular was the horse, as he was considered an animal of war. The dog was quite popular, which may be proved from the following:—"A man should not live in a town where there is no dog."

Rabies was common, and even "diagnosed." Some even suggested a kind of treatment. "Rabies is the effect of an evil spirit, or a witchcraft, and its symptoms are five in number—he keeps his mouth open; his saliva is constantly flowing; pendulous ears; his tail lies closely upon his loins; he walks on sideroads, and does not bark."

"The cure for hydrophobia is the eating of a part of the dog's diaphragm."

This kind of treatment was strongly condemned by other sages.

"A man should not believe one who says that he was bitten by a rabied dog and he is still alive."

The danger was so great, that the Rabbis allowed the Holy Day of rest to be broken:—"A mad dog is so dangerous that he may be killed even on the Sabbath."

Mention is also made of the introduction of certain breeds of dogs, as a result of crossing dogs with wolves and foxes.

Cat. White cats bite worse than black. It bears young 52 days.

Sheep. Preventive medicine was practised on sheep: "Shorn sheep wore on the forehead a sponge or a piece of woollen cloth saturated with oil, as a protection against cold. To fatten female sheep, their udders were bound up so as to prevent the formation of milk."

"Sheep copulate with goats."

The Talmud recommends goat's milk in cardiac trouble:—"Goat's milk fresh from the udder relieves pain of the heart, and that of the white goat possesses special curative properties against diseases of the spleen. The same organ of the goat which has not yet borne young is recommended."

Pig. The swine is one of the three animals most subject to disease—its intestine resembles that of man. The period of gestation is sixty days.

Camel. The camel is also subject to rabies.

Horse.—Flexor tenotomy was performed on the king's horse when his royal rider died, so that it should not be used by anyone else.

The general use of horse shoes is not mentioned in the Talmud, but in war-time horses were provided with metal shoes.

Bibliography.

Code of Hammurabi, Dr. Tcherno, Bible, Babylonian Talmud, Jewish Encyclopædia.

. . . . . .

By a coincidence, we have received from a Cardiff reader the following note:—

"A client of mine showed me to-day a copy of 'The Code of Hammurabi'—(Hammurabi was a king of Babylon about 2,250 years before Christ). Amongst the various laws originally written in cuneiform characters was one which the author of the above has translated as follows:—

'If a veterinary physician operate on an ox or an ass for a severe wound and save its life, the owner of the ox or ass shall give to the physician as his fee one-sixth of a shekel.' (This would be about 5d.)

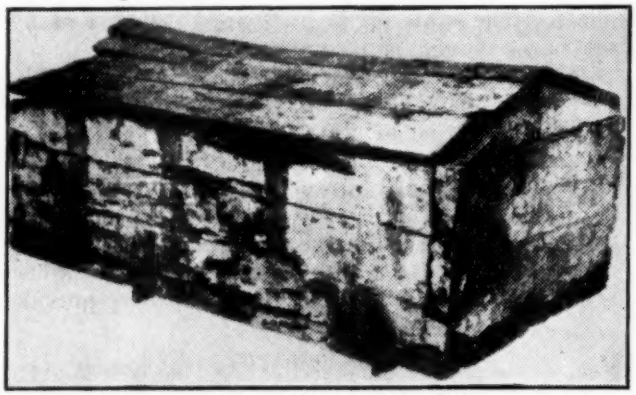
Another clause:—

'If he operate on an ox or ass for a severe wound and cause its death, he shall give to the owner of the ox or ass one-fourth of its value.'

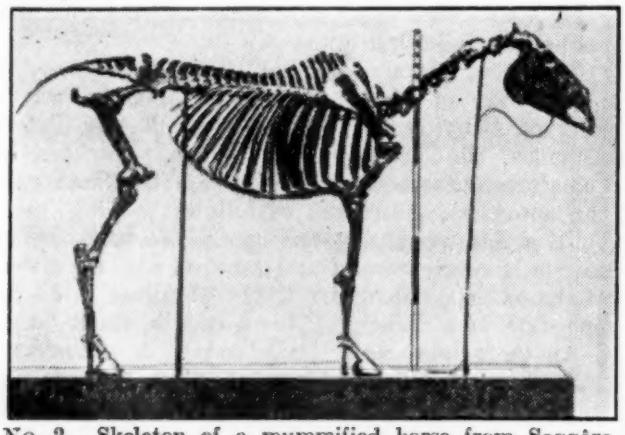
"It would be interesting to learn the cost of living in those days."

An Ancient Egyptian Horse.

Des Annales du Service des Antiquités de l' Egypte, vol. xxvi., contain a very interesting account by J. E. Quibell, B.A., of the Department of Antiquities, Saqqâra, and Lieut.-Col. A. Olver, C.B., C.M.G., Royal Army Veterinary Corps, of the finding of the mummified remains of a horse enclosed in a massive wooden coffin, 2.44 metres long, 1.30 metres wide and 1 metre high. The discovery was made in an old kingdom, Mastaba, to the east of the pyramid of Unas. The coffin lay on a slope, east to west, and was filled with sand from percolation through the planks. The body was wrapped in cloth and tied with four bands 0.30 metre apart, the legs being doubled up and tied with papyrus ropes. Most of the flesh had disappeared from the bones, but the latter were in good condition—many of the cartilages could even be removed without breaking. There was not sufficient evidence to fix the date of burial with any precision, but between the XXth Dynasty and the Ptolmaic period is quoted—roughly, 3,000 years. The skeleton has been set up and is now in the Cairo museum. Owing to the brittleness of the bones it was deemed inadvisable to bore the long bones for the reception of the usual iron supports in the setting up process. The horse is judged to have been about 18 years of age at the time of its death, about 14 hands 1½ inches high, somewhat powerfully built and of a type resembling the Libyan horses which were famous as chariot horses at a somewhat later period. Apparently it had never been shod, and the hoofs were in perfect condition but different in type from the typical Arab horse of the desert. The bones of the limbs were of fine quality and very sound for an aged animal. Another interesting feature about the find was that the coffin or box was painted white with four vertical bands of yellow bordered with red, markings quite plainly to be seen on the photographs accompanying the description.



No. 1. Wooden coffin, which contained the mummy of a horse, found in a re-used Old Kingdom mastaba at Saqqâra.



No. 2. Skeleton of a mummified horse from Saqqâra, found in the coffin shown above. In order to obtain an approximately true profile, the photograph was taken from a considerable distance and enlarged. The scale is in feet and inches. J. M.

Tuberculosis Eradication from the National Standpoint.*†

By Dr. J. A. Kiernan, Chief Tuberculosis Eradication Division, Bureau of Animal Industry, Washington, D.C.

The livestock owners of the United States, in co-operation with the livestock sanitary officials of the various states, and the federal bureau of animal industry, have been engaged for a period of eight years in an effort to control and eradicate tuberculosis of livestock.

For many years prior to 1917, the leading veterinary authorities of our country watched with much apprehension the spread of infection from herd to herd; from county to county and from state to state. They were eager to attack the problem many years ago, but could not obtain the necessary support and funds. They did not sit idly by, however, for they expressed their knowledge of the conditions which threatened our livestock industry on platform and in bulletins, advocating the necessity for taking up arms against such a formidable foe as tuberculosis lest the time should come when it would have gone beyond the possibility of control and eradication. State and federal authorities pointed out many years ago the necessity for inaugurating such a campaign as was launched in 1917. Progress has marked the steps of the work from year to year, and in a later paragraph the speaker will endeavour to show that substantial progress has been made and is now being made. In this brief paper it will be my purpose to omit many of the phases of the work that are so well known to you, and that have been so often repeated, in order to afford time to bring up some of the present phases, and the problems that are being encountered. It is unnecessary to explain to an audience of this class the meaning of an accredited herd, area work or modified accredited area. Others will speak of the combination test and of the many problems encountered daily by the veterinarians who come in actual contact with the livestock owners in the field, and upon whom the great responsibility of the work rests. It will be my endeavour to point out the importance of the work from a national standpoint.

In all livestock disease control work in the United States that has been performed since 1884, the federal government has assisted the various states in conquering outbreaks of an infectious or contagious nature. It is well and proper that the federal government should assist states, for, should any infectious or contagious disease become so widespread in any state that it would go beyond the possibility of control, it would be as great a menace to the sister states as to the one particularly involved. While each state is sovereign in itself, there is that freedom of movement of man and animal interstate that virtually ignores interstate lines to all extent and purposes; therefore, a livestock infection in any state is a menace to the whole nation and the general public is interested in it and has always supported measures and provided funds to permit the federal government to assist the states. There have been various outbreaks of foot-and-mouth disease during which the state and federal governments have always worked as a unit, fighting side by side in conquering the common foe; likewise in other diseases. At no time, however, in the history of the country have the forces worked more closely together than in this campaign. The livestock owners of the country have watched this team work and the success that has been obtained up to the present time, and are encouraging the continuance of the amalgamation through the consummation of the work.

It is estimated in 1917 that tuberculosis was causing a loss of approximately $40,000,000 per annum, and that each year the disease was neglected, the losses were increasing. Suppose no steps had been taken to check the progress of the disease. What do you suppose would be the condition in 25 years? There is no doubt that the disease would spread into every community in the nation, and would involve a high percentage of the herds in each state. This thought was gleaned from the spread of the

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disease in some of the older states where it is known to exist to at least 50 per cent. of the cattle. No one can calculate what such a condition would mean economically to the United States. It could not be figured in hundreds of millions of dollars; therefore, the effort put forth and the funds expended, even admitting that they are great at this time, are infinitesimal compared with the tremendous losses that would have followed had the disease been neglected. It will probably require one hundred millions of dollars or more to eradicate tuberculosis in the United States or to reduce it to less than one-half of one per cent., but in our judgment no better investment could be made, because it would be an assurance of better livestock, more food, beef and milk, for our ever-increasing population. And it means more than this: it means a pure, wholesome untainted food supply free from the infection that has made the whole world weep—the infection of tuberculosis—the "great white plague."

As livestock workers, desirous of rendering service to the great industry in our particular capacity, disease control, our aspirations have been, are now, and ever will be in these United States to keep our livestock free from the infections that cause death, debilitation, lack of production, and loss to the owner. We have ample grounds upon which to predicate our work from the economic importance of controlling diseases of livestock, and it was on that programme that the tuberculosis campaign was inaugurated. However, there is another aspect to the subject that is at least of equal importance, if not greater, and that, the public health aspect. It was believed for a number of years before Professor Koch stated that there was no danger of transmitting tuberculosis from animal to man, that it was necessary to control this disease because it was communicable to human beings. Upon that platform the federal meat inspection was inaugurated about 1892 (that was 14 years before the Federal Meat Inspection Act was enacted in Congress). The chief of the bureau of animal industry, at that time Dr. D. E. Salmon, saw plainly that in order to protect the consumer of meat products from infection of diseases transmissible from animal to man, it was necessary to make *post-mortem* examinations on all animals slaughtered for food. His jurisdiction at that time was rather limited, but he established inspection in many parts of the United States, which gradually expanded until the Act was passed by Congress in 1906. Dr. Salmon was one of the veterinarians who took issue with Dr. Koch regarding the relationship of animal tuberculosis to man and in a bulletin published by him soon after the conference at London he pointed out the danger and insisted upon the necessity of meat inspection as a safeguard for public health. Much could be said relative to the transmissibility from animal to man of tuberculosis, but time will not permit a lengthy review of work done by many investigators throughout the world. It is believed proper, however, to call your attention to the most excellent report made to the Medical Research Council of Great Britain by Dr. A. Stanley Griffith, pathological department of the Field laboratories, University of Cambridge. This article, entitled "The Danger of Tuberculous Milk," being one of the most comprehensive papers on the subject, I take the liberty of reading it to you in full.

[Dr. Kiernan here read Dr. Griffith's paper, which appeared in *The Veterinary Journal*, No. 598, Vol. 81, No. 4, April, 1925.]

In this connection the speaker had the privilege of attending several sessions of both the International and the National Tuberculosis Congresses that met in Washington recently. Considerable discussion ensued relative to animal tuberculosis and its relation to man. It seemed to be the consensus of opinion that, while there are many points that are not thoroughly established relating to the disease, it is absolutely advisable to eradicate bovine tuberculosis, if such a thing is possible. Some of the speakers at the congress expressed doubt as to the possibility of supressing the disease, and one speaker referred to a particular herd that was free of the disease for several years, but on re-test reactions were found. We frequently hear such statements made. About a year ago investigation was made of a number of accredited herds that were removed from the list on account of having become re-infected, but of a total of 100,000 herds it was found that less than five per cent. of breaks occurred, and the majority of these were caused by the addition of untested cattle to the herds. The speaker has no misconception of the danger of re-infecting accredited herds so long as tuberculosis exists to the extent which it does in the United States. As an indication of the danger of spread of infection from badly infected areas, your attention is called to the movement of cattle from parts of Northern Illinois after the Chicago milk ordinance requiring the tuberculin testing of all dairy cattle, which went into effect April 1st, 1926. There were several dealers of cattle in that section of the state who, being unable to get their herds tested, undertook to sell them all over the eastern part of the country. There were hundreds of such cattle moved interstate, and wherever they were located a high percentage of infection was found. We must reduce the infection in every section of the country before we can feel in any way sure that danger of the spread of the disease is past.

Progress in Accredited Herd Work.

The chart on the wall indicates by annual periods the progress made in accrediting individual herds of cattle. It also indicates the total number of cattle tested during the same intervals. You will observe that in 1926 there were nearly 9,000,000 tests made, and, judging from the reports received for this fiscal year, there should be at least 10,000,000 tests made during the current year. The accrediting of individual herds of cattle is not being followed up so closely now as before; therefore, much effort was put in the area plan of conducting the campaign. You will recall that the original plan for accrediting herds contemplated only pure bred herds. This programme was changed so as to include grade herds as well. I have no hesitancy in saying that many grade herds have been accredited without any benefit whatever to the owners. Such herds consisted of a few cattle which the owners had no occasion to sell, and from which they derived little benefit by supplying milk to the neighbouring towns or cities.

The accreditation of herds is a wonderful stimulus to the work and should be continued, but the unimportant grade herds should be eliminated and only pure bred and important grade herds kept on the list. These herds should be regularly tuberculin tested by accredited veterinarians. It is cheap insurance to the owner, and an assurance that he is maintaining his herd on a safe and sound basis.

You will recall the statement made many times that in the original programme for tuberculosis eradication work the second project was the eradication of the disease from circumscribed areas. This plan was not advocated until 1920, notwithstanding the fact that it had been tried out in the District of Columbia as early as 1908, and was found practicable. You will see on the chart that on June 30th, 1926, all the cattle in 329 counties out of the 2,900 agricultural counties in the United States were tuberculin tested. Not all of these counties are modified areas, because to attain modification it must be shown that the disease exists to less than one-half of one per cent. In addition to the above mentioned counties there were 427 counties engaged in area work, making a total of 756. On that date there were 198 modified counties. On September 30th, 1926, there were 228 modified counties.

The speaker pointed out at the annual meeting of the U.S. Live Stock Sanitary Association in 1918 the field that was to be opened to the practising veterinarians for re-testing accredited herds. This was done to let them take part to a greater extent in tuberculosis eradication work. At that time there was considerable agitation and complaint that private veterinarians were being overlooked, but that thought was without foundation, because from the very earliest date of the campaign it was absolutely known that the number of regularly employed state and federal veterinarians would never be large enough to tuberculin test all the cattle in the United States, and

that the vast amount of work would in time be carried on by the practising veterinarians. As time progresses it becomes more apparent to the veterinary profession that the practising veterinarians are to assume the greater burden of responsibility in assisting in tuberculosis eradication work and in maintaining thereafter herds free from tuberculosis.

The chart on the wall is an indication of the development of the work which is being performed by accredited veterinarians, and as the years advance the proportion of work done will increase more rapidly than heretofore. The bureau receives from time to time communications from interested persons who want to know if the federal government is going to re-test accredited herds; if it is going to re-test all the cattle in modified areas; if it is going to re-test dairy herds supplying milk to towns and cities. The replies sent out state that federal veterinarians are to be employed in eradicating tuberculosis from herds of cattle, and when that disease is eradicated they are not to be employed for the re-testing of tuberculosis-free herds. Their services are to be made available to the owners of herds that have not been freed of the disease. Therefore the policy of the bureau as it goes on freeing herds and areas is to leave the work to the local veterinarians, who will, of course, work under state laws and state rules and regulations. The accredited veterinarians will be assuming a great responsibility in taking care of all that work, but it is the only class of individuals, capable by training and practice, of performing the work.

Tuberculosis in Poultry.

The foundation upon which our poultry industry must be built is freedom from disease. A diseased flock can not be maintained on a paying basis, even though it may represent the best blood in our country.

There are many ailments common to the poultry flocks of the United States, but, perhaps, tuberculosis is one of the most destructive diseases found throughout the Middle West. The map here will give you an idea concerning the extent and distribution of this disease. The yellow area represents the territory where the disease affects not more than one per cent. of the flocks. The green area where the infection is from one to seven per cent., and the black more than seven per cent. The information from which this map was compiled was provided by our field forces, which are co-operating in tuberculosis eradication work in every state in the union. The losses due to avian tuberculosis run into millions of dollars annually, and are rapidly increasing. This disease not only affects poultry but swine also, and it is responsible for many retentions in slaughter establishments.

The United States bureau of animal industry has been studying tuberculosis in poultry for more than 25 years, and has endeavoured to find a practical way to eliminate the disease, bearing in mind that any plan to be successful must be easy and cheap to apply, as the farmer will not devote much time and expense to the care of the average barnyard flock. With this thought in mind the bureau issued instructions to its veterinarians engaged in tuberculosis eradication work to inspect the poultry on every farm visited, provided this plan met with the approval of the co-operating state officials. When suspicious birds are found autopsies are held, provided the owner's permission can be obtained. If lesions of tuberculosis are found, instructions are issued concerning methods to be employed in cleaning up the infection. The plans found most practicable for cleaning up poultry tuberculosis on farms where clinical cases are found are as follows:—

(*a*) If the flock is of the common barnyard class, the quicker and more practicable method is to slaughter and burn all clinical cases and vacate the premises of all chickens for a reasonable length of time. The premises should be thoroughly cleaned and disinfected, and if the buildings are good they should, if possible, be moved to clean ground. Re-stocking should be made with day-old chicks or mature birds from clean flocks.

(*b*) Another plan is to cull all clinical cases and slaughter them. Maintain the old flock in fenced quarters. Re-stock with day-old chicks raised in an enclosure on clean ground.

(*c*) Tuberculin test the flock at intervals of 90 days. Practice cleanliness. Raise new flock on clean ground, in fenced quarters.

These plans are being extended in some states to provide for the testing of flocks where clinical cases are not found, thus giving an additional assurance of freedom from tuberculosis.

Each plan provides for a general educational campaign which is always necessary in combating any contagious disease.

The reports for the fiscal year ended June 30th, 1926, covering work done by veterinarians engaged in co-operative tuberculosis eradication work under the plans as outlined are as follows:—

Flocks inspected	157,950
Flocks apparently free	148,099
Flocks infected	9,751
Fowls autopsied and found affected with tuberculosis	*10,279
Estimated number of fowls inspected...	14,012,923

* 0.7 per cent.

Michigan reports the greatest amount of this kind of work done, with 41,649 flocks inspected, 39,559 of which were apparently free, and 2,091 being reported as infected. Two thousand and six infected birds were posted. A total of 3,454,885 fowls was reported as having been inspected.

Ohio ranks second with 20,994 flocks having been inspected, of which number 20,172 were apparently free, while 623 were found to be infected. One thousand and sixteen fowls were posted and lesions of tuberculosis were disclosed. It is estimated that approximately 700,000 birds were inspected.

This is indeed a very creditable showing to be made, as this work was done without any additional expense, in connection with the tuberculin testing of cattle.

Several states have adopted a programme for conducting tuberculosis work. This plan contemplates the accomplishment of so much work each year; the testing of herds in so many townships or counties; the gradual reduction of infection and the accrediting of counties when the infection has been reduced to less than one-half of one per cent. The bureau is in thorough accord with such a programme. It does not over-reach a reasonable outline for progressive steps of the campaign. It is true that conditions may arise to interfere with the carrying out of such a programme, but it is believed that the Congress of the United States and the respective state legislatures will want to know as far as possible how long it is going to take, and how much money it is going to consume to reach the peak of the work, and approximately the length of time necessary to keep the campaign in active operation, and it is only a fair proposal to furnish the legislative bodies with some comprehensive plan of operation.

One of the present-day problems of the campaign is: How are we going to obtain cattle to replace reactors removed from herds? Several years ago when an owner desired to increase his herd he used to buy replacements locally, or in some cases he sent out to other states for pure bred cattle, but with the event of tuberculosis eradication work and the precaution used by livestock owners to prevent the introduction of infection into their herds, they avoid making purchases of cattle except from accredited herds, modified areas, or herds the health status of which is known. The idea is to seek out territory and herds known to be free of infection. This plan has grown into very large proportions, as indicated by the number of cattle now being moved interstate. It would seem that the constant purchases of cattle from one community would so deplete the herds that it would be unprofitable to the owner, but the far-seeing owners in such localities have for several years been saving more of their female calves, which have proved profitable to them.

There are no grounds for believing that tuberculosis eradication work is going to ruin either the cattle or beef industry. Statements to that effect were made early in the campaign, but subsequent history has proved their

fallacy. The industry is in better condition to-day than it has been in many years, notwithstanding the fact that from 29,000,000 tuberculin tests that were made from 1917 to June 30th, 1926, the 1,008,096 reactors that were removed, were condemned and destroyed.

CONCLUSION.

The degree of success which has been attained in tuberculosis eradication work is due to the united efforts of those interested in the industry. Co-operation has been the keynote of the campaign. It was laid down at the outset as the principal foundation of the work, and it is hoped that it will never be less effectual than it is to-day.

The most potent influence in favour of the work outside the regulatory authorities has been the press and the agricultural papers. The editors, both of the daily press and the periodical farm papers, have watched the work carefully, pointing out from time to time ways by which the methods might be improved upon. They have encouraged the officials and livestock owners to work together in this great enterprise. The livestock exchanges throughout the country, recognising the importance of checking tuberculosis, and realising the future benefits to be derived through its suppression, lent their assistance by actively co-operating in appointing commissioners who have carried on educational work and encouraged legislative bodies to provide adequate funds for the campaign. Active co-operation has been received from so many sources that it is difficult to enumerate those who have participated. The agricultural colleges, through their extension services and veterinary departments, have rendered valuable support. Practicing veterinarians throughout the country have rendered most excellent service, both by making private tuberculin tests for herd owners and by assisting county, state and federal forces in area work. More than 6,000 veterinarians have qualified by written examination to do tuberculin testing under the uniform herd plan. All in all, we have been working together harmoniously for more than eight years, and it is the hope of the great organisation which I have the honour to represent that this co-operative spirit shall prevail to the consummation of the work.

NOTANDA.

The treatment of disease by the administration of animal organs or their extracts was practised in a crude way as far back as the year 600 B.C., when testicular substance is said to have been used for the cure of obesity and impotence.

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The chemical isolation of the first endocrinous principle occurred in 1901, when Takamine discovered the hormone of the suprarenal gland.

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Malta fever arises from the consumption of milk secreted by cows afflicted with abortion. The affected milk may be purified by pasteurisation. (*Iowa Evening Gazette*).

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The fourth molar tooth of the dog does not involve the maxillary sinus. (*Vety. Med.*).

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Chronic pruritus in dogs, of unascertainable cause, may often become cured by the administration of a course of potass. bromide. In some other cases, especially when the skin is dry and scaly and the animal obese, a course of thyroid gland will clear up the whole condition.

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Sheep and mules are apparently less frequently affected with neoplasms than other species of animals. (*Vety. Med.*).

H. K.

The Veterinary Record.

16th April, 1927.

R.V.C. REBUILDING FUND.

In January last an appeal for £50,000 towards the re-building of the Royal Veterinary College, Camden Town, London, was issued by the Governors of the College. The Governors were advised that a sum of not less than £80,000 would be required to place the College in a satisfactory position in respect to buildings, and a further sum of £5,000 would be necessary for equipment. The Lords Commissioners of His Majesty's Treasury have sanctioned a grant from the Development Fund of £35,000 for the erection of new buildings and renovating existing buildings, on the understanding that, following the usual procedure of such public grants, an equal sum, on a pound per pound basis, was provided by and through the Governors. The sum of £85,000 is therefore, computed to be required to rebuild the Royal Veterinary College, London.

It is questionable whether that amount is sufficient. We would prefer to see it quoted at a level £100,000 at least, and, provided that the profession will back up the Governors of the College in a great response to obtain the desired £50,000, His Majesty's Commissioners might see their way graciously to signify their appreciation by agreeing to the extension of their grant to an equal amount. It is a situation in which the profession can prove its value. The rebuilding of the Royal Veterinary College, London, is not of local interest only, nor a matter altogether concerning graduates of whom it is the *Alma Mater*. London is the capital of our Empire, the largest and the acknowledged greatest city in the world. It is therefore desirable, from all points of view, that the veterinary college and veterinary educational centre there established should be the finest and most complete that money can provide. We must all remember that it was the pioneer of veterinary education in our Empire, and for that reason alone its prestige should be upheld, and it should be made pattern to all veterinary institutions, no matter in what country they may chance to be.

Since launching the appeal, roughly £10,000 has been subscribed, a detailed list of subscribers up to the end of March accompanying this week's issue of the *Record*. Though this amount may be deemed satisfactory for the short space of time the appeal has been in operation, the General Purposes Committee

of the Board of Governors are most anxious for the full, sympathetic co-operation of members of the profession, and that every avenue should be explored whereby donations may be speeded up, and the desired sum guaranteed.

To aid them in this duty, and especially to show and ensure the maximum effect of the response of the profession to the appeal, a Sub-Committee of Members of the Royal College of Veterinary Surgeons has been added to the General purposes Committee of the Board of Governors, with power to act as a Sub-Committee. The members so appointed are: Major F. Hobday, F.R.C.V.S. (Chairman of the Sub-Committee), Mr. E. Alfred West, F.R.C.V.S., Mr. J. W. McIntosh, M.R.C.V.S., Major-General Sir John Moore, F.R.C.V.S., Professor Geo. H. Wooldridge, F.R.C.V.S. and Mr. H. J. Dawes, F.R.C.V.S. (President and Honorary Secretary respectively of the National Veterinary Medical Association), and Lt.-Colonel J. W. Brittlebank, M.R.C.V.S. (President of the Royal College of Veterinary Surgeons). This representative Sub-Committee, convenient, too, in point of residence for active assistance to the Board of Governors, have expressed a very strong hope that members of the profession will give them their strongest personal support in the very desirable object to which the General Purposes Committee of the Board of Governors have set their hand. Under a letter signed by the members of the Sub-Committee, collecting cards will be issued to Fellows and Members of the profession, whereon not only the donations which they themselves have contributed, or will contribute, may be entered, but donations which they are able to procure from sympathisers amongst their clientèle. It is the personal interest of members which counts for so much, and through which the success of the appeal will be achieved. We commend the appeal to our readers, and we trust that the action of the Sub-Committee to awaken the best response of the profession will meet with unfailing support. From time to time, subscription lists will be inserted in the *Record*, so that the progress of the Fund may be duly noted.

"*Vis unita fortior.*"

Tuberculosis Incidence in British Cattle.

Resentment was expressed at the last meeting of the Royal Agricultural Society of England at the suggestion that 50 per cent. of British dairy cattle are tuberculous.

On the motion of Sir Merrik Burrell, chairman of the Veterinary Committee, the council unanimously resolved that the society "desires to express the opinion that the statement of the Free Importation of Canadian Cattle Association of Great Britain that 50 per cent. of British dairy cattle are tuberculous is unjustifiable, inaccurate, unsupported by any evidence or authentic figures and merely a biassed estimate calculated to mislead uninformed opinion." It was also resolved that copies of the resolution be sent to the Minister of Agriculture, the Chairman of the Agricultural Committee in the House of Commons, and the Town Clerk of Glasgow.

"The Rotters" and their Reward.

Performance Produces £125 for the Victoria Veterinary Benevolent Fund.

In 1913 Colonel P. J. Simpson produced a play entitled "Sweet Lavender," on behalf of the Victoria Veterinary Benevolent Fund, at Maidenhead, and on that occasion was enabled to hand over to the Treasurer the sum of £70; but in his effort with "The Rotters," which was presented at the West Central Hall on Friday of last week, the success then attained was handsomely eclipsed.

There are no half measures about Mr. Maltby; every member of the family of this plebian J.P., with the mayoralty as his ambition in life, relentlessly stripped of all pretentions to "respectability" as the play proceeds, stands revealed as a "rotter" before the final curtain. But not only were we vastly amused by every intriguing individual in the Clugston household—we positively loved them, with a specially warm corner in our hearts for the arch-rotter, Councillor John, for from the start we knew them for what they were, a generous-spirited band of talented artistes who were giving of their brilliant best for a worthy cause. We "in front" shared, in a minor degree it is true, in the happy consciousness of being "all together" (as was musically emphasised at the close) in the effort which was being made to augment the resources of the Victoria Veterinary Benevolent Fund. How, then, could the evening have been other than a supremely jolly one? To begin with, it seemed that *everyone* was there, with his lady; the show itself went with a splendid swing, and at the end came the triumphant culmination of the announcement that the net proceeds amounted to the fine total of £125.

The performance was patronised by many members of the profession, including the Presidents of the R.C.V.S., the N.V.M.A., the Victoria Veterinary Benevolent Fund, the Director-General of the Army Veterinary Service, the Chief Veterinary Officer of the Ministry of Agriculture, and members of Council and officials of the R.C.V.S. and N.V.M.A.

For the gaining of this praiseworthy end the means were entirely adequate. The achievement of familiarity with light comedy is not, unfortunately, enumerated amongst our editorial duties, still less the acquirement of a nice discrimination in its criticism, but the experiences of the evening lead us confidently to venture the paraphrase: "If you know of a better play, go to it," or to quote the advertisement which appeared when the play was originally produced: "If you can't laugh at 'The Rotters,' see a Vet.!"

Each individual "rotter" was splendidly cast. Colonel Simpson achieved a notable realism in his representation of the booming, parochially-ambitious J.P., bullying his somewhat cynical household into joint worship at the shrine of "respectability." It was indeed entertaining to witness the intrusion into his design of the fell hand of circumstance. Fascinated by the inevitability of his ultimate utter discomfiture, we watched the inroads into his bluff self-assurance made, in succession, by the expulsion of his younger daughter from the "best" school in the country, the appearance of his son on a charge of "d. and d." before his rival on the Bench for the mayoralty, the present scandal of an "affair" between an "Eton and Oxford" chauffeur (none the less a chauffeur) and his winsome elder daughter, and the dual shadow from the past which arises to cloud his own relations with Mrs. Clugston. As all these undermined the shrine and finally brought it crashing to the domestic hearth, one found in Colonel Simpson an actor able to impress us, in the midst of all this hilarious farce, with the pathos of a crushed spirit enduring the devastating bombardment of family blackmail.

Further evidence of Colonel Simpson's histrionic ability was his power of maintaining, without a lapse, the strong North country brogue which he assumed.

Mrs. Winifred Watkinson gave an exceedingly clever rendering of the wife, who, perpetually eclipsed by husband and children, endeavoured to maintain her status in the household by outbursts of volubility and mother-love, but earned nothing more gratifying than the verdict, " a good sort, to be ignored." Mrs. Watkinson's performance was undoubtedly a polished one. As the errant offspring, Miss Betty Mosses Miss Raie Jay and Mr. Leslie Martin, presented a vividly accurate picture of modern young people expressing characteristics common to all times. It may be doubted if any band of amateurs could have found three people better suited in every respect for the parts they portrayed. Mr. Frank Stuchley was admirable as the chauffeur who, both openly and clandestinely, lead the assault on the Clugston fetish, while engaged in such subsidiary pursuits as doing his job and subtly courting the attentions of the entire feminine element of the family. Mr. Stuchley's rendering of a character by no means easy to interpret, showed evidence of great dramatic ability. The minor characters of Phœbe, the servant, and the strange lady (in other words, the first Mrs. Clugston) were in admirable hands in those of Mrs. J. W. Butts and Miss Winifred E. Round. Mr. Hulme Jones gave a creditable rendering of the part of Detective-Inspector Wick. The scene (the morning room of Mr. Clugston's house) was appropriately furnished and presented a pleasing appearance. The whole production reflects the greatest credit on the honorary producer, Dr. Watkinson.

The string orchestra, under the honorary direction of Mr. Alec. Dempster, rendered most tuneful selections before the performance and during the intervals, their music adding very materially to the enjoyment of the evening.

At the close of the performance, which was punctuated throughout by outbursts of merriment and applause, Colonel Simpson announced the financial result of the effort, which was greeted with great cheering.

Mr. S. H. Slocock, the President of the Fund, then, from the stage, asked the audience to accord a very hearty vote of thanks to the ladies and gentlemen who had entertained them and, coupled with them, those who had assisted in any way in the success of the event. He also wished to thank all those who had come and supported the effort. They had had a glorious evening and had enjoyed themselves immensely, having witnessed some really wonderful acting. (Cheers.) He did not intend to say much about the Victoria Veterinary Benevolent Fund, but he desired to inform them that during the last six years they had given away upwards of £1,000 a year to deserving veterinary surgeons, their relatives and dependents. During 30 years they had disbursed about £12,000, half of which had been distributed in the last half dozen years. He was sorry that there was a need for such a Fund in the profession, but he supposed it was a feature common to all professions. While he was reluctant to specify any one person in particular in connection with that splendid effort that evening, he knew he would be forgiven if he specially identified Colonel Simpson with its success. (Cheers.) Colonel Simpson and his friends had entertained them wonderfully (Cheers.)

The audience accorded the vote of thanks with great enthusiasm, making Colonel Simpson the recipient of musical honours, which were indeed richly deserved.

Transit of Animals Order.

The *London Gazette* contains the new Transit of Animals Order of the Ministry of Agriculture placing restrictions on the conveyance of animals both by sea and by rail. The Order defines the parts of vessels to be used for animals, and the pens and fittings required; and lays down rules as to the construction of railway trucks, cleansing and disinfection, etc.

CLINICAL AND CASE REPORTS.

Skinned Alive.

By P. J. Howard, M.R.C.V.S., Ennis, Co. Clare.

The title seems terrible and wickedly cruel, yet it is the only one that can at all convey a picture of the case.

Last April I was summoned to see a three-years-old heifer, off which the skin had sloughed from the upper portion of the body, from the shoulder to the tail, more on the right than on the left side.

There was no history, further than that she was grazing on a ranch and had not been seen for several weeks until she was found the previous day with the upper surface of the body red raw, and a few patches of dried up skin here and there. I had no idea, nor had anyone else, as to what was the cause. We thought of lightning, or beating, or painting with some acid as a possible cause. The heifer was, however, in fair health, though much afraid to move and the affected parts were very painful to the touch. She was kept in a good clean stable and well fed. The body surface was painted in patches with watery solution of iodine, until the whole surface had been done. The part gradually dried in patches and a light scar skin formed. She was fat in December and butchered. Owing to her colour (almost white) I could not get a proper photograph.

On August 10th I was summoned to attend a 2½ years old bullock. He was one of a lot on a ranch, and the previous day the herd noticed him get suddenly wild and start to gallop, which he did for over an hour, finally throwing himself into a ditch where he remained, apparently dead, for some hours. Meantime the herd procured help and the bullock was pulled out. He was alive but could not be roused or make any attempt at sitting up.

He was got on to a hay bogie and conveyed two miles to a house where I found him next day.

He was then lying naturally. His head looked a bit swollen, the eyes were swollen and closed and the nostrils swollen. He was breathing a bit faster than normal, but to the ordinary onlooker there was no more to be seen. When I came to examine him I found that he groaned when touched and that the whole skin, from his neck to his tail and down each side to his elbow, and stifle, was one hard crust. There was not a hair off, but the skin was shrivelled and crusted.

It dawned on me that he had been stung extensively with bees and investigation confirmed the matter. I explained to the owner that probably all that crushed skin would slough off, which it gradually did, leaving him skinned alive. It was then that I thought of what had occurred to the heifer in the previous case. This one was treated in the same fashion—dressed in patches occasionally with watery solution of iodine, and well fed. The first photo shows him six weeks after the occurrence and it demonstrates that the only skin left is that of the head, neck, abdomen and legs.

The second photo shows him at the end of October, when the part has dried up in patches.

The third photo reveals the condition at the end of February. The lower portion has healed well, but all above the white line is still raw.

Of course, he is not worth all the trouble of expense that has been incurred, but the owner was anxious that he should live and I must say I am particularly pleased that he has done so. As there is no such case recorded, I think it of special interest.

The medical world assumes that when two-thirds of the body surface is so injured that death must ensue. This bullock must have been fairly near it.

Persistent Lymphangitis in a Mare: Death.

By W. E. Blackwell, M.R.C.V.S., Towcester.

Subject.—Half-legged mare, good stamp, ten-years-old, free worker, in good condition, not excitable, required no whip.

Symptoms.—*December* 15th, 1926. Diffuse swelling, extending from between forelegs to within a few inches of the udder. Upper margin of swelling was level with stifle on either side. Not painful, pitted on pressure. Temperature 105°F., mare not stiff, but dull.

Diagnosis.—Lymphangitis.

Treatment.—Five drams physic, hot fomentations, massage, stimulating liniment.

Course of Disease.—*December* 16th. Temperature 103°, swelling slightly reduced.

December 18th. Temperature normal. No change in swelling. Ordered exercise, also prescribed stimulants and tonics, and as feed, crushed oats, bran, chaff and linseed cake.

I now left the case, believing that with this treatment the mare would follow the usual course and get better in a week or ten days.

January 19th, 1927. One month later. Called to mare again, found swelling exactly as on first occasion. Temperature normal. Owner asked me if mare would die. This question rather set me thinking. I told him she would certainly not die, though I did not remember seeing a case so persistent—this after he had informed me that the swelling had never gone right away. I inquired particularly about her temperament: quiet, excellent worker, not excitable, but free, no whip required. I took the pulse at the submaxillary artery—steady, good pulse. Heart appeared to be functioning normally. I now had the swelling clipped short as I thought there might be some dermatitis present from lying out on wet muddy land to account for persistence of swelling.

The hair was off in patches, but that was all. Tonics fomentations, massage, liniment and exercise continued. No more physic.

February 2nd. A fortnight later, called to mare third time. Swelling rather more diffuse. I now blistered one side of it, and told owner to blister the other side thirty-six hours afterwards. Wyley's green blister was used.

February 4th. Mare tucked up. Has sunk in condition. Case not so hopeful. Owner repeats question: "Is mare going to die?" Reply less definite and optimistic. Like the Scot, I had my doubts.

March 7th. Down in field very weak. Still feeds. Mare now shot. During past month there have appeared diffuse swellings of the head, hind legs and in the perinæum, which have fluctuated in size and extent, sometimes subsiding almost entirely and then re-appearing. Mare has shown progressive weakness, hanging lower lip, resting head on edge of manger or ground and dozing, but brightening up when approached and spoken to. Lies most of her time. Has had periodic diarrhœa, copious and offensive.

Remarks. I do not remember seeing a fatal case of lymphangitis. I did not see the mare after February 4th, but the owner gave me the particulars here recorded after that date. He then revealed the fact that an acquaintance

of his had told him more than once during their talks on market days that his mare would die and that she had got "water round the heart." Hence his repeated question to me as to whether his mare would die.

Was it a case of toxæmia affecting the heart muscle? The acquaintance referred to had a mare die about this time showing very similar symptoms and presumably "*water round the heart*" on *post-mortem*.

P.S.—My client had his mare shot unknown to me and without giving me a chance to see the autopsy.

Gall Stones in a Canary.

By J. W. EDINGTON, The University, Sheffield.

The bird was submitted to me for examination by its owner, Mr. Nicholson, who also supplied the following clinical history:—

"The bird is a Yellow Norwich Cock, and was born in May, 1923. In 1924 he was healthy, vigorous, active, plump, and a splendid breeder. In 1925 he was in good health until June, when he then commenced to have periods during which the breathing was stertorous, more especially after any slight exercise. He quickly recovered from these attacks and was otherwise fairly active. The bird was not as successful in breeding as he should have been in his second season. In 1926, about January, he became very mopish, and the breathing was stertorous and wheezy for several days at a time. Between attacks he was apparently quite well.

"The bird showed considerable improvement in April and was then mated. He was not successful as a breeder, and appeared to be not at all well during most of that time.

"In August he became much worse, sat on the perch all day with his feathers fluffed up and lost flesh rapidly, although he ate both ravenously and gluttonously. The stertor of the breathing was very marked and he had occasional bouts of choking. The droppings were copious and soft and were apparently passed without difficulty.

"Since then he has steadily though slowly got worse."

DECEMBER, 1926.

The bird was killed with chloroform, and the *post-mortem* was carried out with aseptic precautions.

BACTERIOLOGICAL EXAMINATION.

Blood from the heart, some liver tissue, a swab from the peritoneal cavity, and some of the intestinal contents were inoculated on to blood agar and McConkey plates, and also into blood broth. These were incubated both aerobically and anaerobically at 37°C.

All the cultures were sterile except those taken from the intestinal canal, and from the latter no pathogenic organisms could be isolated.

PATHOLOGICAL EXAMINATION.

The following organs were removed and sectioned and showed no abnormal changes either microscopically or macroscopically, viz., brain, lungs, spleen, kidneys, heart, and various parts of the intestinal tract. Two gall stones were found, one entirely filled the gall bladder and projected into the right bile duct, whilst the other was in the left bile duct.

The one in the gall bladder was shaped like a miniature cottage loaf. The transverse diameter of the basal part was 2.5 m.m., whilst that of the smaller part was 1.5 m.m. The length of the stone was 3 m.m. The larger basal part occupied the whole of the greatly contracted gall bladder, whilst the smaller part lay in the right bile duct; the constriction in the stone corresponding to the cystic duct. The other stone, which was in the left bile duct, was oval in shape, in length measuring 2 m.m. and in breadth 1 m.m. The long axis of the stone lay in the direction of the duct.

Both stones were of a dull white colour and easily crumbled. They gave positive reactions to Salkowski's and Liebermann's Tests for cholesterol. Typical cholesterol crystals were obtained on crystallisation from an alcoholic solution of the material composing the stones.

The liver was sectioned, and showed a marked dilation of all the bile ducts. Around the medium-sized and large ducts there was an excess of fibrous tissue, and throughout the latter a certain amount of proliferation of the bile ducts could be detected. The lobular arrangement of the liver, except where the liver cells had been destroyed and replaced by the above-mentioned fibrosis, was quite unaffected.

The liver cells exhibited some fatty change, but no accumulation of bile pigment could be detected in them.

The bile ducts showed a varying amount of catarrh of their lining epithelium, and throughout the liver substance the blood vessels appeared quite normal.

I regret that I had not the opportunity of chemically examining the droppings during an attack, as this would probably have been a help in the diagnosis of the disease.

ANATOMICAL AND HISTOLOGICAL NOTES ON THE BILE DUCT SYSTEM IN THE CANARY.

During the above investigation a knowledge of the anatomy of the bile duct system in the canary was found to be essential. Nothing definite could be found by searching in various veterinary and zoological books. The most information was obtained from Bronn's "Tier-reich"; but even in it the description referred to only a few special birds, and was lacking in detail. It, however, served to show that the structure of this system varied greatly throughout the bird kingdom.

It was therefore decided to fix the abdominal organs of a healthy canary *in situ*, and, by means of serial sections, to work out the anatomy and histology of the gall bladder and bile ducts.

The gall bladder lies adjacent to the inferior surface of the right lobe of the liver, and its lower half projects beyond the anterior margin of this organ. Its size depends naturally on its bile content; but usually it measures about 1 c.m. in length and, at its widest point, about 0.5 c.c. in breadth.

It is typically pear-shaped.

Mesially, in its upper third it is closely related to the bile ducts, portal vein, and hepatic artery, and is attached to these by means of connective tissue. Except at its upper pole, where connective tissue binds it to the liver surface, it is not attached to the liver, but is kept applied to the inferior surface of the latter organ by the pressure of neighbouring abdominal organs.

It contains a clear, slightly viscid, light green bile. Its walls are thin and from within outwards consist of

.1 A mucous membrane which has a layer of clear columnar cells supported by a small amount of reticular tissue.

2. An exceedingly thin layer of plain muscle fibre.

3. A correspondingly thin layer of fibrous tissue.

When not completely distended with bile the gall bladder contracts down, with the result that the mucous membrane projects inwards at various points in a papilliform manner —thus giving this lining a serrated appearance.

The general structure of the larger bile ducts is similar to that of the gall bladder except that the muscle layer is very much thicker and the internally projecting folds of mucous membrane much more marked. The latter appearance gives one the impression that the lumina of the ducts are capable of great expansion.

The bile ducts as they leave the liver substance are two in number—a right and a left. Both open into the duodenum but by separate orifices, and the right duct alone communicates with the gall bladder.

The left duct, soon after its exit from the liver substance, comes into relationship with the posterior part of the mesial surface of the gall bladder, being, however, separated from the upper pole of the latter by the portal vein and the hepatic artery. Immediately in front of the left duct the right duct can be seen closely attached to the wall of the gall bladder by means of connective tissue.

A little lower the vein and artery become related to the middle part of the mesial surface of the gall bladder, thus lying between the two bile ducts.

A little below the superior pole of the gall bladder on its mesial aspect the cystic duct arises, and, lying alongside the right duct, passes downwards for a short distance before it joins with the latter. A little later the portal vein and hepatic artery commence to diverge from the gall bladder and lie directly mesial to the left bile duct. Here the right and left bile ducts are respectively in close relationship with the antero-mesial and postero-mesial surfaces of the gall bladder. The right duct about this point comes into contact with the duodenum, and is bound to its wall by connective tissue. It runs in the reverse direction to that of the duodenal contents until, just before it pierces the muscle layer of the duodenum, it turns acutely upon itself, and continues its course for some little distance in exactly the opposite direction in the wall of the intestine before opening into the latter. Where the duct passes through the intestinal wall collections of lymphoid cells are to be noticed in the submucosa of the intestine. The left duct reaches the duodenum at a point nearer the stomach than does the right duct. Its method of entrance into the intestine is similar to that just described for the right duct except that it comes into close relationship with a pancreatic duct. The pancreatic and left bile ducts pierce the duodenal wall alongside each other and run parallel to each other in the wall of the gut. They open by separate orifices into the intestine. It is to be noticed that there is no acute flexion of the pancreatic duct at its point of entrance into the duodenum such as has just been described in the case of the two bile ducts.

I am indebted to Mr. Henry Gray, M.R.C.V.S., for a list of books dealing with the anatomy of birds.

TRANSLATION.

On Ocular Tuberculosis in the Cat.

By MM. ROBIN AND LESBOUYRIES.

In a previous communication to the Society, one of us already reported two cases of iritis in the cat, and pointed out the remarkable predisposition of this species for ocular localisations of tuberculosis. The present note aims at showing that bacillary changes may extend to other parts of the eye, notably to the conjunctiva and to the membranes of the posterior segment.

The subject observed is a cat three years old, living in a restaurant, which before being brought to us was treated without result for acute conjunctivitis of the left eye. At the time of our examination, the lesion had assumed an aspect entirely different from that usual in the ordinary inflammatory changes of the conjunctiva.

The upper conjunctival sinus is filled with a large swelling spreading on the one hand over the free extremity of the eyelids and on the other over the sclero-corneal limbus. This swelling is reddish, shining, firm, and smooth in the part which extends towards the temporal angle, furrowed and hollowed by a slight ulcerous depression in the internal angle. Here it insinuates itself under the membrana nictitans without contracting the smallest adhesion to that organ, which has remained sound. Opposite this pseudo-chemosis, the cornea is slightly vascularised and opalescent over a small area. There is neither photophobia nor watering.

The indocility of the animal prevents us from forming a judgment on the modifications of visual acuteness and does not allow of examination with an ophthalmoscope. All we can do is to note a slight anisocoria ; the pupil of the diseased side, a little dilated, is less sensitive to light than that of the right eye.

The tumorous aspect of this conjunctival lesion, the presence of ulceration at its surface and information obtained about the animal's way of life, incite us to examine scrapings of the ulcer, where we find numerous granular acid-fast bacilli, and to give a subcutaneous injection of tuberculin which is followed by a very definite thermic reaction.

Post-mortem examination of the subject shows no tuberculous lesion in the parenchymae or the viscera, but dissection of the diseased eye reveals profound changes in its membranes. The tumour which stood out under the upper eyelid is adherent to the sclerotic from the sclero-corneal limbus, which is slightly deformed here up to and beyond the equator of the eye. This fleshy mass is easily separated from the neighbouring tissue ; but it adheres closely to the sclerotic, with the tissue of which it is confounded. A few fine filaments float about in the aqueous humour.

After opening under water the ocular globe, the crystalline lens, the iris, and the ciliary zone do not appear changed. But the retina has lost its usual appearance as a slender, fragile pellicle ; it is irregularly thickened, fleshy, reddish ; it is easily detached from the choroid membrane. A scraping made of fragments of the retinal tissue shows numerous bacilli of Koch.

The choroid membrane, laid bare, has no longer on its internal aspect that greenish-yellow tint which gives the tapetum of the cat its peculiar aspect. This membrane is grey, spotted with black ; its surface is shagreened, and its thickness, normally very slight, attains to more than two millimetres. Finally, the pigmentary connective tissue which unites the outer aspect to the sclerotic (*lamina fusca*) is replaced by reddish matter, foul, rich in acid-fast bacilli.

Histological examination shows that the new formation developed at the expense of the conjunctiva and the sclerotic is a conjunctivo-vascular tissue in which are scattered some follicles, ill-defined, and recognisable only by the greater density of the round cells, with which are associated a few epithelial cells.

The internal or retinal zone of the choroid membrane, corresponding to the pigmentary epithelium and to the membrana Ruyschii, is completely disorganised. The pigmentary masses are sometimes disposed in the form of irregularly parallel streaks, sometimes distributed without order in the midst of connective elements which appear to have undergone, at certain points, a purulent discharge. The external layer (the layer of the large vessels) is also very disturbed. Instead of the connective stroma which serves as support to the vasa vorticosa, we find a tissue of new formation, the structure of which is variable according to the region examined. In certain places, we note a massive infiltration of round cells which tend sometimes to group in ill-defined nodules in the centre of which no giant cell is found. In other places the connective tissue has an aspect analogous to that of myxomatous tissue : it is sprinkled with large cells, generally ovoid, and having small discoloured nuclei. Finally, traces of adult connective tissue, rich in fibrillary elements, furrow the section in different directions.

It is difficult to discover the probable origin of such lesions. Practitioners of human medicine agree in considering that if from the mere clinical point of view tuberculosis of the cornea, iris or choroid membrane may develop in individuals in appearance healthy, it is derived always from an endogenous tuberculous infection. The total absence of tuberculous lesions in the rest of the organism of the subject we examined, authorises us to ask if, in some cases at least, the eye might not be directly infected with tuberculosis by the projection of virulent material on the conjunctiva and the cornea. Previous experiments of Panas seem to show, it is true, that the insertion of bacilli of Koch into the corneal lamellæ produces only localised keratitis ; perhaps there would be reason to resume such experiments by varying the mode of inoculation.

From another point of view, the present observation, like those of Hancock and Coats, and those reported here previously, show that chronic lesions of the eye in the cat involve a strong suspicion of tuberculosis. One must not, however, conclude too hastily ; we have had quite recently an opportunity of observing subacute lesions of bilateral parenchymatous iritis in a cat which, subjected twice to the tuberculin injection, showed no reaction.—[*Ex Recueil de Médicine Vétérinaire*, No. 10. May 30th, 1926.]

R. L. HIGGINS.

REVIEW.

Tierheilkunde und Tierzucht.

This work is an encyclopædia of information of a practical character for the use of veterinarians and animal breeders, the first work of its kind to appear since the publication of A. Koch's "Enzyklopädie der Tierheilkunde und Tierzucht" in 1885. The authors have aimed at the production of a comprehensive survey of the present state of knowledge and practice in veterinary science and animal husbandry, and have subordinated the discussion of subjects from a purely scientific, *e.g.*, anatomical, physiological, chemical, point of view to the presentation of subjects of more direct practical importance, *e.g.*, organic and infectious diseases, surgery, obstetrics, pharmacology, meat and milk hygiene, immunology, diseases of the bee, fish and silkworm, mouse and rat control, etc. They have refrained from giving a critical judgment on questions the issues of which are still doubtful.

The material is arranged in alphabetical order in a series of articles of varying length as demanded by the subject of each. In the more lengthy descriptions, the explanation of several related terms is combined under the one heading.

Two volumes have appeared so far, containing some four hundred and fifty articles, some of which are of considerable length, as for example, that on Abortion, to which over fifty pages are devoted. The first volume deals with subjects A—Aug, and the second Aug—Deg. Each volume is prefaced by an alphabetical list of the subjects treated, and at the end of each volume is a full alphabetical index of terms supplementing the subject list at the beginning. Brief lists of references to literature are appended to the more important articles. The work is generously illustrated with reproductions of photographs and drawings.

The editors have had the advantage of the help of a hundred and twenty-five collaborators from various countries, who have contributed to the work.

[STANG, Dr. VALENTIN, Professor Veterinary College, Berlin ; and WIRTH, Dr. DAVID, Professor, Veterinary College, Vienna. "Tierheilkunde und Tierzucht," 1926 7½in. by 10¼in., vol. I., pp. xi-796, 382 figures ; vol. II ; pp. vi-765, 332 figures. Berlin : Urban and Schwarzenberg.]

D. K.

R.C.V.S. LIBRARY.

The following books have been added to the Library during the past week : Oppermann, "Lehrbuch der Krankheiten des Schafes" ; Marshall, "The Physiology of Reproduction" ; Monvoisin, "Le Lait et les Produits derivés" ; and Cadiot, "La Tuberculose du Chien."

Books may be borrowed from the Library by Members of the College on payment of postage both ways. Apply to the Librarian, 10 Red Lion Square, London, W.C.1.

BRANCH REPORT.

Meeting of the Northern Branch at Birmingham.*

Mr R. Boutflour on "The Management of Cows for High Milk Yields."

On the occasion of the annual meeting of the Midland Counties' Division, separately reported, a joint meeting of the Northern Branch of the N.V.M.A. with that Division was held in the English Theatre at Birmingham University, on Friday, February 11th, when a lecture was given by Mr. R. Boutflour, M.Sc., Director of Dairy Husbandry, Harper Adams Agricultural College, Newport (Salop), on "The Management of High Yielding Cows." An invitation to attend was issued to members of the Birmingham Chamber of Agriculture, whilst many lady students of an agricultural college in the neighbourhood were also present.

Lieut.-Col. J. W. Brittlebank (President of the Royal College of Veterinary Surgeons) presided, supported by members of the Midland Division (whose attendance is recorded in the proceedings of the Division), and Professor G. H. Wooldridge (President of the National Veterinary Medical Association), Messrs. J. Holroyd (President of the Lancashire Association), Wm. Woods (Wigan), A. W. Noel Pillers, F. Knight (Secretary of the N.V.M.A.), J. O. Powley (President of the Midland Division), Mr. H. J. Dawes (Hon. Secretary of the Midland Division), and many other well-known members of the profession.

The minutes of the last meeting were taken as read.

Apologies for non-attendance were received from Major F. T. Hobday and Messrs. L. Parker and J. H Wynne.

Colonel Brittlebank, in introducing Mr. Boutflour, referred to him as a man who had created some considerable commotion in the world of dairy farming, saying: "Most of you will agree that he has done considerable service to the industry, whether or not you accept all that he says. It is a matter of controversy, and we may hear something of it this afternoon. But no one can dispute that Mr. Boutflour has focussed attention on a most important branch of farming and caused us to think about the problem of high production by dairy cows."

Management of Cows for High Milk Yields.

Mr. Robert Boutflour, M.Sc., Director, Dairy Husbandry Department, Harper Adams Agricultural College, Newport, Salop, based his address on his Dairy Husbandry Bulletin No. 1, of the College, which is as follows:—

The full-time recorded cows of this country average just under 700 gallons, and the average of the whole of the dairy cows of this country is probably under 600 gallons.

The writer is of the opinion that if all the cows were systematically and properly managed the average yield could be increased by 50 per cent., and to do this all that is required is to put into practice the scientific knowledge available.

Far too many people think that a cow gives milk, and that all they have to do is to keep her alive by a certain amount of food, and milk her to obtain their requirements, whereas the truth is that the cow is a factory for the conversion of vegetable foods into milk, and like any other factory her output is largely dependent upon the amount and quality of the raw material (food) provided for consumption.

When one reads a Milk Record Society's Year Book and sees the various herd averages, these figures are generally taken by the average reader to indicate the capacity of those particular herds to give milk. This reading is wrong, for the truth is that in 90 per cent. of the cases the yields opposite any particular herd are only indications of the degree of management that the particular herd has been subjected to, for what does one find? Averages from as low as 400 up to averages well exceeding 1,000 gallons, the majority being between 500 and 700 gallons. The writer knows of no herd worthy of the name, where average luck has been experienced, where such low averages as 700 gallons could be obtained if an efficient and proper system of management was in practice. To emphasise this point, we give below the yields of certain Wiltshire herds prior to and after systematic management has been employed:—

	Herd N.K.W.	Breed principally Friesians and Shorthorns.
1921-1922	Ordinary rationing	859
1922-1923	1st Systematic Rationing ...	1073
1923-1924	2nd ,, ,, ...	1169
1924-1925	3rd ,, ,, ...	1275
1925-1926	4th ,, ,, ...	1360

Cows' yield in gallons.	Heifers' yield in gallons.
2056	1025
1782	1159
1615	1212
1563	1372
1519	
1395	
1314	
1305	
1282	
1238	
1228	
1115	
1110	

One cow in 8 weeks has done 6,336 lbs., and is still doing 109 lbs. daily.

	Herd A.H.H.	Shorthorn Cows.
1923-1924	Before Rationing	670
1924-25	1st Systematic Rationing	1053
1925-26	,, ,, ,, ...	1140

The same remarks apply to heifers as to cows, and indeed the possibilities of heifers as milk producers are not by any means realised. The following figures will indicate what can be done by the systematic management of heifers:—

	Herd G.E.H.	
1923-24	19 heifers bought in open market	924 gallon average.
*1924-25	11 heifers reared on farm over	1000 ,,
*1925-26	14 heifers reared on farm over	1000 ,,

* No roots since birth.

The figures for the cows and the heifers could be much further amplified, not only in the county of Wiltshire, but by putting in results of herds scattered all over England—herds where the yields have been lifted by as much as 300 gallons per cow per year, and it is no exaggeration to say that of the cows that look like dairy cows, one out of every two will do over 1,000 gallons, and that an average of 1,000 gallons is within the province of any farmer who is prepared to adopt efficient management as the keynote of success; moreover, to obtain this, one has only to purchase the ordinary commercial useful cow.

Principles of Management.

To obtain results, as illustrated in the foregoing, the following principles of management are necessary:—

(1) The cow requires a maintenance ration, *i.e.*, sufficient food to maintain her body.

(2) The cow requires in addition a production ration supplying the raw material necessary for her to produce her output of milk. This quantity will vary according to yield. The standard taken for production per gallon of milk is 2·5 lbs. Starch Equivalent containing ·6 lbs. Digestible Protein Equivalent.

(3) The capacity of a cow's stomach must never be overloaded.

(4) The non-use of chaff and also the elimination or reduction in the quantity of succulent foods.

(5) The cow must not only not suffer from thirst, but must also have sufficient water to provide for all the milk she is capable of producing.

* Received on March 6th, 1927.

(6) All the essential mineral ingredients must be supplied in suitable quantity.
(7) A cow requires preparation for her lactation.
(8) Good general management.
(9) Efficient milking.
(10) The cow must be kept naturally laxative.

(1) The Maintenance Ration.

The function of the maintenance ration is to keep up the heat of the body, provide the material for repair of tissue, and to supply the necessary energy for the maintenance of life, and one of the best foods for this purpose is well-made hay. It used to be a common practice to prescribe a definite quantity of food for maintenance purposes, but it is now known that the production ration always contributes something towards maintenance, and therefore the maintenance ration can be varied in accordance with the yield of the cow just as it is commonly varied in accordance with the weight of the cow. In the past it has been the general practice of the majority of farmers to feed a maintenance ration composed of hay, straw and roots. The writer has never been able to obtain as satisfactory yields with such a maintenance ration as with one of hay alone. This subject will be further dealt with under heading (4), *i.e.*, the non-use of chaff and also the elimination or reduction in the quantity of succulent foods. We shall indicate later, after dealing with the Production Ration, how the quantity of hay to be given for maintenance can be arrived at.

(2) The Production Ration.

The Production Ration is to supply the raw materials out of which the cow can produce a gallon of milk, and will generally be composed of about 3½ lbs. of a mixture of cake and meals (concentrated), of which the following are typical examples :—

(*a*) 2 parts beans and 1½ parts oats, feeding at the rate of 3¾ lbs. per gallon.
(*b*) 1 part decorticated ground nut cake, 2 parts rice meal or maize, 2 parts maize gluten feed, 3 parts palm kernel cake } feeding 3½ lbs. per gallon.
(*c*) 3½ lbs. coconut cake, feeding 3½ lbs. to the gallon.
(*d*) 3½ lbs. palm kernel cake, feeding 3½ lbs. to the gallon.
(*e*) 2 parts linseed cake, 1 part rice meal or maize } feeding 3½ lbs. to the gallon.
(*f*) 1½ parts raw linseed, ½ part meat meal } feeding 2 lbs. to the gallon.
(*g*) Maize gluten feed, 3½ lbs. to the gallon.

Ration (*a*) is a very useful home-grown ration, but it has the disadvantage of being rather too much of a mealy nature. It would be improved if used in conjunction with the ration (*b*) (*c*) or (*d*).

Ration (*b*) is a standard ration advocated up to 5 gallons.

Ration (*c*) is used for the production of the first gallon on farms where hay is inclined to be of a binding nature, and generally fed as a thick porridge by soaking overnight. Ration (*d*) is used in conjunction with rations containing a high percentage of meals so as to increase the percentage of cake. This allows of better cudding. This cake is often thought by farmers to be disliked by cows. This may be so at the commencement, but once the cows have been gradually educated to it, they will eat it most freely. Ration (*e*) is a supplementary ration for high-yielding cows and is fed for every gallon over 5 that any particular cow is giving or over 3 on high-yielding heifers. Ration (*f*) is a further supplementary ration for the last gallon for cows giving over 7 gallons and for heifers giving over 5. Ration (*g*) is mixed with other rations where the percentage of the butter fat is inclined to be low. The Coconut Cake in Ration (*c*) also has a slightly uplifting effect on the butter-fat content of the milk. As there are many farmers who do not want to feed supplementary rations, and who desire a more complex ration that can be fed to all cows, the following all-round well-balanced standard ration is advocated :—

1 part coconut cake
1 part decorticated ground nut cake
1 part linseed cake
2 parts palm kernel cake
2 parts rice meal
1 part maize gluten feed
} feeding 3½ lbs. to the gallon.

(3) Overloading the Cow's Stomach.

The cow's stomach must not be overloaded, and the following system is recommended to overcome this difficulty.

Taking the maintenance and production rations together, the total quantity of food fed per day to the average Shorthorn cow of 11 cwt. should not exceed 33 lbs. of hay and concentrates, although it might be under this figure, and should be varied 3 lbs. for every cwt. over or below, so that a 10 cwt. cow would get 30 lbs. total food, and a 12 cwt. cow 36 lbs. total food. These weights should be assumed with the cow in normal flesh condition and not governed by the amount of flesh she is carrying at any particular moment. For illustration, we will first take an 11 cwt. cow feeding hay for maintenance and 3½ lbs. concentrates per gallon.

Yield.	Concentrates.	Hay.	Total.
3 gallons	10½	20	30½
4 ,,	14	19	33
5 ,,	17½	15½	33
6 ,,	21	12	33
7 ,,	24	9	33
8 ,,	26	7	33

From the foregoing it will be noticed that the hay must be controlled, and the writer considers this one of the most important factors in the management of the high-yielding cow. In the old system of feeding hay *ad lib.* there is a tremendous amount of hay wasted, and what is more tragic still, a tremendous quantity of milk is lost through the cow's stomach being overloaded. On many of the farms which the writer has rationed only half the quantity of hay is used that was used previously. In the case of farm A.H.H. mentioned at the beginning of this pamphlet, prior to the farmer rationing on the foregoing lines he was either buying hay in April or just had sufficient to carry through. This year, after two winters' rationing, he started hay-making with 70 tons of old hay on the farm, and this with a herd of only 30 cows and heifers. In fact it is in the feeding of the hay that the cowman needs to show the greatest amount of skill. Probably the lowness of the cows' yield of this country is due more to the overloading of the cow's stomach than to any other factor. How often has the writer accompanied farmers on their nightly visits through the sheds and found the cows grunting vigorously, and the owner remarking, "Ain't they nice and comfortable ?" Surely such a remark is a demonstration of colossal ignorance. A cow lying down and grunting is suffering from indigestion and is most uncomfortable. She is somewhat similar to many persons after dinner on the 25th December, and having realised what an uncomfortable state this is to be in, remember that many of our cows are in this condition twice every day during the 365 days of the year. Overloading of the stomach is the primary cause of many cows ending their days before their normal time. It should be clearly understood that the capacity of the cow's stomach is limited, and governed by the size of the cow and by the class of food it has got to deal with, and is not governed by the yield of milk she is giving. A cow when giving a high yield has no greater stomach capacity than when she is giving a low yield, so that in the feeding of cows for different yields the quantity of food should be constant as near as possible, but there should be a variation of the concentration of the ration as has been illustrated in the varying of the quantity of hay and meal.

Now let us take the case of the average cow fed in the ordinary way with a ration somewhat as follows :—

14 lbs. hay
7 lbs. straw
56 lbs. roots
} for maintenance,

and then 3½ lbs. cake and meal per gallon of milk. When this cow is fed for two gallons she is full ; when fed for three

gallons she is more than full, and begins to grunt ; when fed for four gallons and over, she is suffering from indigestion. How can one expect cows which are fed under such conditions to maintain a high flow of milk ? In fact, the writer is confident that such cows after calving would give more milk if straw and roots were cut out altogether. The cow would then make better use of the concentrates fed. Farmers feeding such large quantities of food should realise that they are trying to put 40 lbs. of food into a 33 lbs. stomach, and at the same time they should remember that 40 into 30 will not go, and the disease that cows die of when fed in such a way might well be called " mathematics." In the case of heifers, the maximum figure for total foods wants bringing down from 33 to 27 lbs. so that the heifers receive as much as 6 lbs. less hay per day than cows giving the same quantity of milk. No doubt some will be scared at the suggestion to feed cows with such large quantities of concentrates, but it must be remembered that for high-yielding cows it is the only source from which they can draw their raw material, and if the concentrates are not fed in accordance with their yields, then the cow will of necessity have to reduce the output of milk that she would otherwise give. Remember, that a cow produces milk from food given her either to-day or on some past occasion, such food having in the meantime been put into the flesh and constitution, so that when a cow is giving milk in excess of the quantity for which she is being fed she is producing it from her body and constitution. If a cow is giving 4 gallons of milk and has only been fed for 3 gallons then she is taking off 2 lbs. of beef to produce the extra gallon. The writer has yet to find it economical to produce milk from beef-steaks, and if a farmer thinks it is sound business to produce 1 gallon of milk for about 2 lbs. of beef let him go to his butcher and offer him a gallon of milk for 2 lbs. of beef. To say the least of it, the butcher's remarks would be edifying. Milk produced off a cow's back is the most expensive milk that the farmer obtains, for not only, if the animal lives, will it take a large quantity of cake and meal to replace that beef, but he is also robbing the cow of her constitution, and this is the reason why many high-yielding cows go to the knacker yard prematurely. Now, there are a large number of cows which are permitted to produce milk off their backs at the expense of their constitution, for how often has the writer gone through the sheds and remarked on a cow looking rather thin and worried, " What about this cow ? " and received the answer, " She is giving a lot of milk and it is pulling her down."

This would never happen if the cow was systematically managed. On the other hand, one comes to a cow looking fat and well, and finds that she is a 1-gallon cow being fed for 2 gallons. Such a system will never lead to profit. The overloading of the cow's stomach reduces the general fitness of the cow, and this is the reason why so many cows look so sorry for themselves. Many farmers have the notion that scientific rationing means excessive feeding, but in actual fact the above principles of feeding maintenance and production rations mean using less food than is being fed by the average farmer to-day to his cows. In the past the amount of food that a cow can deal with per day has been stated by scientists and agricultural advisers in lbs. of dry matter per day, but this is not scientifically sound. The factors that really count are the amount of food that a cow can deal with per meal, and how often meals can be repeated per day. Moreover, the amount of food that a cow can efficiently deal with per day is governed to some extent by the type of food used, inasmuch as some foods have a slower rate of passage through the alimentary canal than others. For example, it would take a cow longer to deal efficiently with 20 lbs. of straw than to deal equally efficiently with 20 lbs. of good quality hay. In the writer's experience it is undesirable that more than 11 lbs. total of hay and concentrates should be fed per meal.

(4) Non-use of Chaff and the Elimination or Reduction in the Quantity of Succulent Foods.

A very large percentage of cows in this country are fed with a mixture of chaffed straw and pulped roots. The mixture is bagged up and generally known to the cowman as " bait." Besides entailing a large amount of work, it is probably one of the worst practices in vogue in cow-feeding to-day, and the writer has not been able to find one sound argument in its favour, but has realised many disadvantages of such a practice. We will take first the ear end of the straw. This is fairly digestible, but as you go down the straw towards the butt end, then you come to material which is little more digestible than wood and is certainly most unsuitable food for dairy cows. The chopping of it up prevents the cow from taking the digestible end and leaving the wood, and this forcing of the cow to eat the fibrous end butt is often the cause of indigestion, and has probably sent more cows to the knacker yard than any other cause. This butt end will certainly not produce milk, but will take up a lot of energy from the cow that might have been exerted on the other portions of the food to better advantage ; moreover, it should also be realised that high-yielding cows have not even room for the top end of the straw, without being bothered with the indigestible woody butt. Whenever one goes to a farm and finds that straw enters largely into the diet of cows, one generally finds that large quantities of roots are fed with it. On enquiring why these large quantities of roots are fed you you are told : " Well, I feed a good deal of straw, and the roots make the straw more digestible." This is not so, for what actually is the case ? Straw is a slowly assimilated food with a slow passage through the alimentary canal. The roots do not assist in the digestion of the straw but simply hurry its passage through the alimentary canal, and the result is that much of the straw comes out at the anus into the gutter in a similar condition to what it went in at the mouth, and is consequently wasted and would have been better not fed at all. Many farmers have criticised the writer's method in the past by saying that if they eliminated the roots, they would have to use more hay, whereas the facts are that cows consuming roots often consume an additional quantity of hay, and this additional quantity of hay finds its way into the gutter undigested. Farmers can demonstrate this for themselves, by taking some of the dung from behind the cows, putting it into a basin of water, and stirring well. On those herds where a large quantity of roots are fed, the hay will be noticeable floating on the top of the water. A very sound axiom to all cowkeepers should be that if they find hay and straw in the dung of their cows undigested, then these foods should be reduced in quantity. Chaffing does not make bad hay good, nor straw a suitable food for high-yielding cows, so hay and straw should be fed long. Roots do not make bad hay good nor do they make straw more digestible. All that they do is to get it quicker out of the system. Very often a farmer remarks that he chaffs so as to prevent waste. Surely there is just as much waste to have it go into the gutter through the cow as pulling it out of the manger into the gutter, and there is just as much common-sense in saying that the cow must eat the digestible portion of the straw and the wood as there is in the housewife saying you must eat the lean, the fat and the bone of the joint. Another important point also to remember is that the amount of labour necessary to feed a cow in the manner that has been suggested in this pamphlet is simpler and does not entail anything like the labour that is found in general practice, and also there is a great conservation of food, and it is, consequently, cheaper.

With regard to roots, they are a food mostly composed of water. In fact in 100 tons of roots there is anything from 88 to 92 tons of water. They are expensive to grow, and the writer, after having had experience of rationing some thousands of cows, has been always able to get more milk without them than with them, the reason for this probably being as follows : Roots are laxative, and unless something of a binding and fibrous nature is included in the diet, they quicken the rate of passage of ordinary foods fed through the system, and those foods are consequently not as well assimilated as they otherwise would be, but if the average farmer were to take the roots out of his winter ration and not amend some of his other practices, then in the majority of cases there would be a fall in yield. The

following reasons will illustrate this. On many farms large quantities of indigestible foods are fed, like chaff, poor hay, and undecorticated cotton cake. If roots were not fed along with these foods, then the cow would become constipated and consequently a reduction in yield would result. On other farms too great a bulk of food is fed, and the lack of roots would reduce the rate of passage of the food through the stomach, and on other farms there is an insufficiency of water. On the other hand, if the foods are naturally laxative, and the bulk is controlled, and the water supply is adequate, then roots can be dispensed with altogether, and the result will be that it will cheapen the cost of food and a high yield will be contained. It may be mentioned here that on the dairy farms costed by the Economics Department of Oxford University last year, there was one herd rationed by the writer without roots. This herd was a 100 gallons per cow higher than the next highest and over 400 gallons higher than the lowest herd; still, in spite of this it showed the cheapest cost per cow for food per year, and of course a very reduced cost per gallon.

(5) The Cows must not Suffer from Thirst.

By far the largest ingredient in milk is water, being about 87 per cent. of the total composition. Bearing this in mind it will soon be realised that high-yielding cows require a great quantity of water. The writer has had experience with cows drinking up to 30 gallons of water per day when they have been giving up to 10 gallons of milk, and therefore, if a farmer is out for high yields the supply of water to the cows should receive serious consideration. At the present time there are thousands of cows which have to go from 3 p.m. until 10 a.m. the next morning without a drink; whereas this may be ample for the low-yielding cow it is most certainly not often enough for the higher yielding cow. One of the most important times that a cow should be watered is late evening, about 8 p.m., and if the feeders will only try their high-yielding cows at this time with a bucket of water they will be surprised at the quantity consumed. The farmer has two options if he wishes to remove this limiting factor: either to turn his cows out at this time or to have water laid on in front of his cows, but if the latter is done then it is preferable if this is turned off just before the cows are fed and turned on immediately afterwards. Feeders, however, should appreciate the fact that the laying on of water or watering at night will not increase the output of milk if there are other limiting factors, such as the overloading of the stomach or underfeeding of the high-yielding cows.

(6) Supply of Minerals.

High-yielding cows have a greater output of minerals than the ordinary ration supplies, and a supplementary mixture made up as follows is recommended:—

2 parts common salt.
2 parts ground chalk.
1 part sterilised steam bone flour.

This should be mixed with the production ration at the rate of 2½ lbs. per cwt. of concentrates.

(7) The Cow Requires Preparing for her Lactation.

The feeding of the dairy cow does not start the day she calves, but should commence six weeks beforehand, the process employed being commonly known as "steaming up," and is as follows:—Six weeks before calving the cow is given 3 lb. of palm kernel cake per day and increased every week by 1 lb. per day, so that 5 weeks before calving she is getting 4 lbs., 4 weeks before 5 lbs., 3 weeks before 6 lbs., and a fortnight before 7 lbs. At this stage the cow needs inspecting closely, and if she is beginning to make a show the 7 lbs. palm kernel only is continued, but if she is not making a show then the 7 lbs. of palm kernel should be supplemented with 2 or 3 lbs. of ordinary production ration, and if in the last week before calving the cow is still not making a promising show increase this another 2 lbs. or more. The above treatment ensures in most cases that the cow will calve down in a hard fit condition, and well prepared for the production of high yields. Along with the concentrates the cow is to have the normal quantity of hay, namely, 20 lbs.

Heifers are treated the same as cows except that the hay is kept down to 14 to 16 lbs. according to size of heifer. In addition their udders should be daily dry massaged by rubbing the whole of the udder from the belly down to the teats, and the escutcheon down to the teats; this helps in the development of the udder and tends to prevent "coreing"; it also gets the heifer used to bring handled.

There is one important point to be watched during steaming up, and that is that certain cows and heifers are liable to come to their milk actually before they are due to calve, and if this happens it is most important that they should be milked and kept on being regularly milked right up to calving, for it they are allowed to stand too long stocked before calving it will affect the cow's yield most seriously. Many people are nervous of milking before calving, but the writer has done hundreds with no ill effect, and those that have been so treated have invariably been the heaviest milkers. The importance of steaming up cannot be over-estimated, and the lack of such treatment is one of the largest contributing causes to the lowness of the yields of many cows.

Treatment at Calving.

The day before the cow is due to calve she should be drenched with ¾ lb. of glauber salts with one tablespoonful of ground ginger in three pints of tepid water, and directly after calving this drench should be repeated.

Contrary to general belief, steaming up does not create milk fever but actually tends to prevent it. On many farms where milk fever used to be prevalent, not one case has occurred since steaming up has come into practice followed by the drenching as recommended.

Treatment after Calving.

High yields will not be obtained unless anticipated, and therefore the cow is fed for milk—the day after calving being fed for 3 gallons, the day after for 3½ gallons, and the next day 4 gallons, and on the fourth day after fed for 5 gallons. This amount should be continued until the cow is approaching 5 gallons, and then keep feeding her for ½ gallon above her yield as long as the cow shows a tendency to rise, until her maximum is reached, which is not as a rule obtained until about the 8th week after calving. If this is done the feeder will be surprised at the large percentage that will attain 5 gallons per day and over. Always remember that as the concentrates are increased the hay is to be decreased to make room for it, so that the feeding of a cow before and after calving is as follows:—

Weeks before calving.	6	5	4	3	2
Palm kernel cake in lbs.	3lbs.	4lbs.	5lbs.	6lbs.	7lbs.

continued until calving unless supplemented as suggested in previous paragraph.

Day before calving drench.

Day of calving drench and 7 lbs. concentrates.

One day after calving 10½ lbs. concentrates and 20 lbs. hay.

Two days after calving 12 lbs. concentrates and 20 lbs. hay.

Three days after calving 14 lbs. concentrates and 18 lbs. hay.

Four days after calving 17½ lbs. concentrates and 14 lbs. hay.

(8) General Management.

All cows must be fed strictly according to yield, and assuming 20 lbs. hay as standard for maintenance and a mixture of cake and meals—3½ lbs. providing about 2·5 lbs. starch equivalent and containing ·6 lbs. protein equivalent for production—and assuming an average Shorthorn cow of about 11 cwt. capable of efficiently dealing with 32 lbs. of food per day, then the following table illustrates the quantities of food that should be fed:—

Cow giving	2 galls.	3 galls.	4 galls.	5 galls.
Concentrates (in lbs.)	7	10½	14	17½
Hay	20	20	18	14

	6	*7	*8
Cow giving	galls.	galls.	galls.
Concentrates (in lbs.)	21	24	26
Hay	11	8	6

*Cows receiving supplementary ration.

The cows should be given three meals per day, each meal being one-third of the concentrates followed by one-third of the hay, except in the case of cows giving over six gallons, when if the highest efficiency is required they should be fed four times per day.

The times of feeding recommended are as follows:—

5-30 a.m. 1 p.m. 7 p.m.

In the case of the very high-yielding cows where four feeds are recommended:—

5-30 a.m. 10-30 a.m. 3-30 p.m. 8-30 p.m.

The feeding of the concentrates can easily be controlled by putting above the head of each cow her yield in gallons, or better still the number of gallons that she has got to be fed for at each meal, and then providing the feeder with a ½-gallon tin that will just hold 3½ lbs. of concentrates, the 6-gallon cow getting six tins full per day, *i.e.*, two tinfulls at each meal, and the 4-gallon cows getting four tinsfull per day, *i.e.*, one and one-third tinsfull at each meal, and so on. Another method is to have a bucket or box for each cow with her name on, and weigh out at one time a whole day's ration, the receptacle put in the forestall and one-third of it tipped into the manger at each meal.

If supplementary rations are fed to the high-yielding cows this ration should be divided equally over each feed and not fed separately. The control of the hay is much more difficult and will only come by practice on the part of the feeder, and as its control is so important it is here where the feeder can show his skill, for it must be always remembered that more milk is lost by over-feeding hay than under-feeding it. The rule should be that any hay left a quarter of an hour after its being fed should be removed: this is equally important at night as at any other time of the day. Care should also be taken that high yielding cows do not eat their bedding, as they are liable to do if bedded down with clean straw; if they do it will soon reduce their yield.

If cows are fed as suggested above, high-yielding cows will not lose flesh nor will cows go up in yield on going out to grass which, if they do, is always an indication that they were incorrectly fed when indoors.

To feed cows on the lines indicated, it is, of course, necessary that the cows should be recorded, and preferably daily recorded, especially in the first ten weeks of their lactation, for without recording it is impossible to feed according to yield or to keep a check on the efficiency of the milking; in fact, recording is the key to management and is absolutely essential.

(9) The Cow must be Efficiently Milked.

Efficient milking is most important. The points in milking are that the cow should be milked quickly, quietly and clean, as this influences both the quantity and the quality of the milk.

Where the highest yields are desired then three times milking is necessary, for when this is done the yield per cow per year will be raised about 200 gallons, provided she is in other ways efficiently managed, and on some cows a very much higher quantity. The writer is of opinion that where twice per day milking is in operation then it is not desirable to take the cows much higher than 5 to 5½ gallons per day.

For three times milking the times suggested are:—

5-30 a.m. 1 p.m. 7-30 p.m.

and where milked twice per day the intervals should be kept as even as possible.

The daily records should be closely watched, and any sudden drop in yield of 2 to 4 lbs. should be enquired into.

Having found the cause, this, if possible, should be remedied, and then the cow liberally treated until she has attained her previous yield, and after this fed normally again. This is very important, for the lowness of many yields is not due to a gradual falling off but of intermittent falls that have not been recovered, for whereas a drop of 2 to 4 lbs. per day is not serious if recovered in a few days, if not recovered it may mean nearly a hundred gallons of milk not recovered.

(10) The Cow should be Naturally Laxative.

All the way through the lactation the feeder should watch his cow and see that she is naturally laxative; not only should the dung be loose but in addition the hide should be supple and easily handled, and if this is not the case then either the diet is too binding or the cow is getting too much food, or it may be due to the quality of the hay. The importance of making good hay cannot be too strongly urged. It should be cut young, and if this is done it is immaterial whether the hay be meadow hay or seed hay, but never let seed hay get over-ripe, or yellow in the bottom. Many farmers let the seed hay stay too long so as to get a heavier crop, but they should not think in terms of crop but in terms of milk if they are going to feed it to cows, and even if cutting early means sacrificing half-a-ton of hay per acre it actually means more milk. Never feed bad hay to good cows, for it is poor consolation, having lost the value of the hay in the making of it to lose good cows in the consuming of it.

Some hay is more binding than other, and care should be taken that where the hay is binding a more laxative production ration should be used, such as feeding coconut cake for the first gallon or replacing ground nut cake by its equivalent of soya cake, or by increasing the percentage of the linseed cake. Although rice meal is laxative it should not exceed 25 per cent. of the ration, otherwise the percentage of butter fat is liable to suffer.

It is important that the temperature of the cow shed should not be allowed to get too warm, or high-yielding cows will perspire, get wet back, and consequently chills. A temperature of about 55 degrees should be aimed at.

The production ration can be purchased either in cubes of declared ingredients or the farmer can purchase the ingredients and mix them himself, but they should not be mixed in a heap, for if this is done the meal is liable to sink in the centre and the cakes fall to the outside. The better way is to put a layer of meal on the top and so alternate them until all the ingredients are laid out. When using they should be shovelled up from a straight face and mixed as used in daily quantities.

For real efficient management of a herd it should be a separate and self-contained unit, carrying a staff of its own, whose interest is not divided by having to perform other operations on the farm. Where men are coming back to work at night amongst the cows it is necessary that they should have free time during the day. Where three times milking is done, it is recommended that the men in the dairy be liberated at 3 p.m. in the afternoon until 7-30 p.m., and of course paid for inconvenient hours and efficiency. It is surprising the keenness that will be shown by the men managing the cows, if the cows are responsive to their efforts.

Drying off.

Much trouble is often experienced in the drying off of cows, and the common practice of milking only once per day, and then every other day, often leads to a lot of udder trouble. The method adopted by the writer is to cut down the food, and if the cow is down to between two or three gallons, suddenly stop milking and never handle the udder at all and within a few days the milk disappears. Since adopting this practice there has not been a tithe of the trouble that was experienced before. To prevent any chance of germs entering the teat it is advisable to seal the teat with collodion.

Colour of Milk.

As colour in milk is important to the retailer, although it may be no indication of quality, it is sometimes desirable to feed small quantities of about 10 lbs. of Marrow Stem Kale or 4 to 5 lbs. of Carrots per day.

Where farmers continue to feed roots these should be fed at a time by themselves, and three to four hours after

the previous meal, say, mid-morning or mid-afternoon or both.

Summer Feeding.

The principles of summer feeding are the same as in winter, but now the grass is for maintenance, also in addition counts towards production. Good grass will provide sufficient nutriment for production up to a 3-gallon daily yield, and a supplementary ration of concentrates should be fed for every gallon over three, so that a 5-gallon cow on good grass would receive a production ration for 2 gallons, whereas a 3 or 2-gallon cow would not receive any concentrates. Then as the season advances, a tendency to fall off in yield will be experienced ; at once the productive value of the grass must be reduced, and concentrates fed for all gallons over two as yielded by the individual cow. When still further falls are experienced, supplement the grass for the first two gallons by adding a concentrated cake like Decorticated Cotton or Ground Nut Cake, commencing with 1 lb. per cow per day and increasing the quantity as signs of general fall in yield occur.

Autumn grass has a tremendous effect in lowering the yield of Autumn-calved cows, and for this reason they should be kept on a very bare pasture, or brought in and put on full winter rations. There is a great disadvantage in leaving heavy-yielding cows out in late Autumn, for although cheaper milk may be obtained in October it is always at the expense of much reduced yields in winter from the Autumn-calved cows. Steaming up in Summer or Autumn should also be done on bare pastures.

The writer strongly advocates the housing of the cows during the heat of the day for three or four hours, and the feeding of the concentrates whilst indoors at this time ; where three times milking is in practice, it is advisable to house the cow from the mid-day meal to the evening milking. This is to prevent over-gorging with grass and to allow a fuller digestion of the concentrated food given. Another advantage is that the cows are not worried by flies, and are given a respite from the heat of the sun.

The old story that grass is the natural food for the cow may be classified as a fairy tale, for the cow in these days is not a natural cow, but what breeding has made her ; nor is grass natural grass, but the result of cultivation and manuring. The nearest approach to both in their natural state, is the bison in the wilds of North America. The only reason why grass in May and June gives an increase on many farms is that it does not lend itself to so much mismanagement.

Economics of Milk Production.

There are three main channels in which science can help the dairy farmer to obtain an increased return from his business :—

1. By reducing the cost of feeding.
2. By increasing the yield.
3. By lengthening the life of the cow as a result of better management.

Judicious manuring will cheapen the cost of production of the home-grown foods. With purchased foodstuffs, a balanced ration compounded from the cheapest foods forward bought on a favourable market will considerably reduce the cost, in some cases as much as 1d. to 3d. a gallon. This latter aspect has received a great deal of attention of late.

Higher yields with efficiency is the greatest factor in increasing returns, and has not received the attention it deserves. The following will illustrate its importance :—

Per Winter :—

1-gallon average.		2-gallon average.			3-gallon average.		
1/6		1/6	4d.		1/6	4d.	4d.
Cost	...	1	10		2	2	
Value	...	2	4		3	6	
Profit		0	6		1	4	

The cost of the first gallon includes the Maintenance ration and the 3¼ lbs. first gallon Production ration, also the standing charges—Depreciation, Interest on Capital, Labour, Rent, and Rates on Buildings, and other expenses.

The above clearly illustrates that by increasing the yield in the winter from a 2-gallon average to one of 3-gallon the profit is increased nearly threefold.

Some readers may doubt the 3-gallon average during winter, but the writer has many dairies systematically rationed which never did more than two, but are now well over a 3-gallon average, based on all cows in the herd, including those dry.

In considering the length of the life of a cow it should be borne in mind that recording with a view to obtaining high yields without proper management will in all probability even do harm, for there are two distinct types of high yielding cows, the cow which gives a high yield only when correctly managed, and, unfortunately, the cow that will give a yield in spite of mismanagement, but at the expense of its constitution. This latter is the type that is often prevalent in recorded herds, and as a class are selected for breeding. As a result the cows do not last, and most of them with high yields are tuberculous ; under these conditions, very high yields actually tend to ruin cattle. A Master of Foxhounds recently remarked to the writer : " I like these recording people, they maintain the supply of cattle at the Kennels." Had those cows been managed they would have given higher yields, but not at the expense of constitution, and the other cows in the herd with good constitutions would also have given high yields. Selecting from yields, without management, has left us a legacy of some heavy-milking poor-constituted cows, forcibly showing that it is dangerous to select from high-yielding stock unless those yields have been obtained by management, *i.e.*, from food and not constitution.

There is nothing that will lend itself to management more readily than a dairy cow, and, what is more, the financial returns will adequately justify the same. All the details of the foregoing system have been well tested out in practice, and all the results based on yields which are officially recorded.

(Note.—To facilitate working, all yields expressed in gallons have been calculated on the basis, 10 lbs. to the gallon.)

In conclusion, the writer again states the following facts, which can be vouched for and without fear of contradiction :

1. One cow in two that looks like a milker will do a 1,000 gallons.
2. That these cows are obtainable at most marts, without the payment of fancy prices.
3. That a 1,000 gallon average is within the province of any farmer who desires the same, and who is prepared to adopt efficient management as the keynote to success.

The writer wishes to draw the attention of all readers to the fact that there are very many suitable production rations that can be made up both from home grown and purchased feeding stuffs. No attempt has been made in this publication to deal with the balancing of rations, those that are included only being quite good exzmples. All interested who require their rations balanced should make applicatiin to the Agricultural Organiser of his County, who will do this for them.

Further, remember that the system advocated in this publication starts with dry cows, and that full advantage cannot be obtained straight away, and also any change that is made should be done gradually.

Discussion.

Mr. Wm. Woods, initiating a discussion on Mr. Boutflour's address, said : Anyone is to be congratulated who introduces an entirely new method of doing his farming. Mr. Boutflour especially is to be congratulated for having the courage to ask the British farmer to reverse all his previous convictions, which is a pretty big proposition. I am not going to say there is nothing in what Mr. Boutflour says, but I think there is a little exaggeration in some of it, and that is a little criticism which I hope will be helpful to him. The basis of his teaching can be summed up in a sentence : give no roots, reduce the bulk of your

food and give, in place of bulk, more concentrates. That is an entirely new method, and when a new method is introduced I go to the acknowledged scientific experimenters in farming and see what they say. Take Kellner, head of the Scientific Research Department in Food for Animals at Leipsic. Kellner advocates roots. Then I turn to Macintosh and other well-known authorities and I find they all advocate roots. So that it seems to be Boutflour *contra mundi*. He is busy trying to convert the world. His teaching is revolutionary, but I do not say it should be rejected on that account. I do hold, however, that where a complete reversal of methods is recommended it should be submitted to cruical scientific tests. Let me take one of the results he has quoted, the case of a farm where by introducing his system of feeding he claims to have doubled the output of milk in a year. Might there not be another explanation ? I have lifted the yield by putting in a continuous supply of water, which is possible without any alteration in your feeding. As Kellner says, you want to test not 20 cows but 200, and even then you have not finished your experiment. You must produce a balance sheet to prove that these new methods show a profit. Concentrates, which are usually cakes and meals, are the most expensive foods you can give a cow, and you need to see the financial side of the experiment before you can say you have found a better method. These experiments must be extensive, because you are not only producing a revolution in feeding but in farming also. What is a man to do with his roots ? He has got to grow roots to clean his land and he must find some use for them. Mr. Boutflour says he should grow beet. That may not always be possible, a man may be too far away from a sugar factory ; there may be other reasons. If a farmer gives less hay and roots and more concentrates, it is going to upset the accepted experience that the stomach works best when it is about three parts full. Mr. Boutflour's system will scarcely half fill the stomach. I think some explanation is required as to the objection to the bulkiness of turnips. Nine-tenths of a turnip is water. A cow requires three gallons of water for every gallon of milk she yields, and it does not seem to me that it occupies any more space in a turnip than in a bucket. A cow has to have water and it gets it in the turnip. The ordinary farmer believes that the water in a turnip is valuable. You can buy ordinary water, but you cannot buy the water that is in a turnip. You get certain vitamins in a swede which are not to be found in the other preparations. Vitamins are a vegetable product and they appear in the milk in proportion to the amount of vitamin-producing vegetables that the cow eats. It is the presence of vitamins in milk that makes it such a desirable food for children.

Mr. Woods concluded by paying a compliment to Mr. Boutflour for what he has done in his campaign and said it was a wonderful thing to have interested farmers in the subject to the extent he had.

Mr. BURNHAM asked what was to happen when a farmer got a bad hay season. When his hay was bad his roots were generally good. He believed farmers who had tried Mr. Boutflour's system were satisfied with it. He had tried it partially himself, and although he had not got any more milk his cost of feeding was less.

Mr. YORK (Great Barr) said he read about Mr. Boutflour's system in the press and went in for it about twelve months ago. He had not had the same results as Mr. Boutflour, but he had had some cows get up to six gallons a day, although they did not put flesh on as well as he would like them to do.

Mr. MACKENZIE remarked that what puzzled him was the extent to which the valuable properties in milk were affected by this system. Increased quantity was possible, but what about increased quality ? In a purely commercial sense, if quantity was obtained at the expense of quality the financial result could scarcely be satisfactory.

Mr. TUDOR HUGHES (Oswestry) said the system was revolutionary and he should like to know the experimental basis of Mr. Boutflour's suggestion that 33 lbs. of dry matter was the capacity of a cow's stomach. He had never before heard the capacity of a cow's stomach expressed in dry matter, for it was generally given in liquid matter. This question of dietary needed careful consideration and clients of his who had suddenly adopted Mr. Boutflour's scheme had met with drastic and unexpected results. Any change in the dietary of an animal should, in his opinion, be made gradually.

Mr. BUDGETT (Bristol) spoke of the good results he had obtained from following Mr. Boutflour's system. He was speaking for Jerseys, and his herd consisted of animals of his own breeding. His two-year-old heifers averaged nine hundred gallons each. One had yielded a thousand for three years. There was not much risk in Mr. Boutflour's system. Last year he gave his cows 28 tons of roots and got no more milk. This year he cut out the roots and got more milk. He owned the record Jersey cow, which has already given 1,400 gallons and the year was not up. That cow had been fed absolutely on Mr. Boutflour's system. "There is no more devoted follower of his system in England than myself," he added. "I was converted to it, I was going to say before Mr. Boutflour was born, and I have carried it out with the most complete success for many years, as may be seen from the records of my society." He had not found that the high yield affected the animal's constitution.

Mr. TWEED (Sheffield) asked if Mr. Boutflour had ever noticed ill effects from over feeding, such as scurvy skin. He thought it was not uncommon in the case of cows fed on a lot of concentrates.

Mr. FELLOWS invited Mr. Boutflour's opinion as to whether stanchions were more suitable for securing cows in the shed than chains.

Mr. R. CLUNAS said there seemed to be an impression abroad that Mr. Boutflour had said more than he meant to say. That was not so, because Mr. Boutflour had a whole-hearted conviction in the truth of everything he had said. One thing he had done was to make farmers water their cows at night and those who did it found themselves more than repaid. The farmer who watered at night increased his milk yield by 25 per cent. and one result of Mr. Boutflour's campaign was the introduction of water bowls. "I have not met a single individual," said Mr. Clunas, "who has tried Mr. Boutflour's system who is not an enthusiastic supporter of everything he preaches."

Mr. STEELE-BODGER (Tamworth) said their thanks were chiefly due to Mr. Boutflour, not for inventing those theories, because he did not claim to have done so, but for bringing them into the limelight. He advocated a discontinuance of roots, and certainly roots were the most expensive crop to grow, but it was a curious fact that when cows had a few roots they seemed to get a better bloom on them. He had compared the milk yields at four different farms in which he was interested, where the cattle were all of the same type. The bailiff who fed his cows on roots had the best results according to the balance sheet. That, of course, opened up the question as to who was going to value for the purpose of drawing up a balance sheet. Different people had different ideas on the subject. He would like to hear Mr. Boutflour's opinion on the question of exercising animals. His own experience confirmed that of Mr. Boutflour in regard to milk fever, namely, that when he "steamed up" he did not get milk fever. He thought the secret of the whole thing was fitness, not fatness. He was a great believer in the use of water bowls for ensuring a regular supply of fresh water. Another point was the importance of the bull in high-yielding cows. The bull was generally scrapped at three years' old and many farmers realised after it had gone to the butcher what a good bull they had had. Another point to consider was whether the last gallon given by a high-yielding cow was profitable. Each succeeding gallon after the normal quantity cost more to produce. He had often milked before calving, with satisfactory results. That made "steaming up" essential, and he also thought that massaging the udder was very important. If he milked

before calving he gave a corrective to the calf such as olive oil.

Mr. FROST remarked that in some seasons a farmer could not make much hay. Cows must have some bulky foods and if there was no hay for them what was the alternative to be if it was not roots ?

Professor WOOLDRIDGE said the greatest credit was due to Mr. Boutflour for having put together a lot of stray facts and brought them into line as he had done in his present system. With regard to roots, it was generally recognised that they were a most expensive crop, by comparison with their food value. That was worked out in connection with ensilage. Farmers had already realised that they got better results if they gave a little more concentrated food. In improving the milk yield the question of strain was important, which could only be ascertained by the milk record, so that they could weed out the non-profitable animals. It had been claimed that vitamins were of vegetable origin, but that was not exactly true, because they could be produced by the animal itself in sunshine. With regard to drying off and the use of collodion, which was advocated by Mr. Boutflour, he disagreed with him there. He did not like the sudden drying off of a cow under any conditions. On humane grounds it was wrong in the first place, and it was also going to affect the animal later on. As to the three times a day milking it was discussed in connection with the dairy show in London. As an official of that show he was consulted, and he recommended that in the case of the high-yielding cows three times a day milking should be permitted. There had been time since then to go into the question of costing, and it was condemned by farmers in the south as not being an economical proposition. The extra milk did not compensate for the extra cost of labour and such like.

Mr. BOUTFLOUR, replying to the discussion, said he never claimed to have invented the system which he now advocated. He had been a picker of brains, and it was what other people had done that guided him when he propounded his present theories. It was wrong to suggest that he disagreed with Kellner or any of the great authorities. What he said was, feed according to the yield. The 33 lbs. of dry food which he advocated was not his figure ; he took it from the experience of others and found that it answered. He denied that he used a high protein ratio. He never had a high protein ratio and his tendency was to reduce it still further. Good hay would produce the necessary vitamins. Mangolds did not contain much in the way of vitamins, and if one rationed one's hay one would use far less than one had ever used. In any case, they must not give bad hay to a good cow ; rather supplement a little good hay by using dry grain. Eating the bedding was always a difficult problem. He was trying to find a spray that would stop an animal from doing so, or, as alternatives, he would substitute sawdust or peat litter for straw, or even have no bedding at all. As to a question raised by Mr. Mackenzie, he did not see any correlation between high quantity and low quality. He agreed that any change should be gradual. Milk fever generally came in the autumn. He would avoid autumn grass as he would poison. He believed in "steaming up," and he found it staved off any tendency to milk fever. His whole argument was for the benefit of those who were keeping cows for profit, and low cost in feeding was just as important as a high yield. Still, he did not grudge giving a cow plenty of good food if she gave him plenty of good milk in return. He had no experience of scurvy in cows and, if he found it, he should say it was due to lack of exercise, to which he attached a good deal of importance. He could not say too much as to the value of proper watering. Three times a day watering had proved beneficial. As to three times a day milking, he contended that there was as much profit in the third milking as in the other two put together. At the same time, if a high yield was not coupled with good management they must expect to get "screw" cows. His experience was not that of Mr. Steele-Bodger, as far

(Continued at foot of next column.)

DIVISIONAL REPORTS.

North Midland Division.

(*Continued from Page* 341).

Mr. W. TWEED, replying to the discussion on his paper, "A Review of the Diseases of Dairy Cows mentioned in the Milk and Dairies (Consolidation) Act of 1915 and the Milk and Dairies Order of 1926," said he wished to state at the outset that the Act and Order were new legislation, and in answering controversial points he would offer an opinion as far as his experience went.

In regard to the first point raised by Mr. Fletcher, of giving demonstrations of practical laboratory methods to the local part-time officers, he would only be too pleased to give any assistance that he could, and felt sure Mr. Lloyd would give them every possible facility for doing so.

The term "cold" applied in the description of a T.B. udder was slightly misleading, but it was used to differentiate between a chronic condition and an acute painful condition.

In the diagnosis of actinomycosis, this was a disease of the udder which was extremely rare and very much resembled tuberculosis. However, if the streptothrix filaments retained the carbol fuchsin stain when examining for tubercle, they would be differentiated by their irregular lengths in comparison with the tubercle bacilli. Should the disease be suspected after tubercle had been eliminated, a sample of the secretion from the affected quarter should be sent for culture and special staining in a laboratory.

In the diagnosis of anthrax smears, he could only repeat that if the proper polychrome methylene blue was used, a purple reaction would occur in positive smears and a bluish or greenish colour in negatives. It had been his

(Continued from previous column).

as roots giving a better bloom was concerned. It took twelve tons of roots to give the same feeding value as one ton of rice meal. Exercise was very necessary and it would tend to lift the butter fat content. As to keeping a bull too long or not long enough, he had known farmers in Scotland, after using a bull, turn him out and bring him back in two years if his stock had proved any good. What he had told them was what he knew to be true. He had many theories of his own which had not been tested and he kept them to himself, but he wanted the farming community to have the benefit of facts which had already been proved. He could guarantee good results if they only did what he told them. If they failed to get good results it was because they had not done all he had told them or because they had done something wrong.

At the close, the CHAIRMAN proposed a vote of thanks to Mr. Boutflour for coming amongst them and giving them the benefit of his experience in the all-important matter of feeding dairy cattle with a view to a higher yield. His address had breathed the spirit of progress and proved the importance of team work, which was essential if any good was to accrue to the community. One thing at least Mr. Boutflour had taught them, and that was how little they really knew and how much more there was for them still to learn.

Mr. POWLEY seconded, and said, that as President of the Midland Division, it gave him and his fellow members great pleasure to see such a well-attended and successful meeting.

At the close, a very hearty vote of thanks was moved by the CHAIRMAN and seconded by Mr. J. O. POWLEY. Mr. BOUTFLOUR replied briefly. The whole of the local arrangements were most successfully carried out by Mr. H. J. Dawes.

A. W. NOEL PILLERS,
Hon. Secretary.

experience to encounter slight purple reactions in some negative smears occasionally and then diagnosis must be centred only on the number and character of the bacilli present, if any.

Mr. Fletcher had also spoken about the loss to the dairymen in cases of retention of the placenta and mastitis if the milk was stopped for any length of time. While this might be true, yet he (Mr. Tweed) thought there were cases in which the placenta had been hanging for days and the cow's flanks, udder and tail got covered with evil-smelling discharge and the risk of contamination of the milk must therefore be very great. In all such cases the disuse of the milk was justified and those cows ought really to be all removed for the time being from the dairy shed on account of the fœtid odour from them. In cases of mastitis, there were occasions where the milk might be altered for a very short period, but considerable migration of leucocytes had taken place and the easiest practical method to judge its consistency was to take a fresh sample from the cow, centrifuge it, note the colour of the milk, the amount of sediment and if organisms were present. If the sediment was very small, the colour of the milk normal and no organisms present, the milk might be used. There was the great difficulty in cases of acute mastitis of one quarter of an udder, whether or not to allow the milk from the other three quarters to be used. It had been shown that causal organisms were occasionally secreted in the milk from the three apparently healthy quarters, but not in all cases, and if the milk was satisfactory to the test just mentioned, it could be used after the animal had passed the acute stage of the disease.

In reply to Mr. Hudson, it had been his intention to omit mentioning the origin of the oval cells found in a high percentage in tuberculous milks, because the staining had been carried out by himself, and in staining tuberculous milks with a cell stain it had been found that the leucocytes were more easily recognised than the oval cells which, as a rule, were difficult to stain owing to the fact that they were degenerated cells and did not take the stain well. His opinion, however, was that those oval cells were epithelial cells derived from the udder acini when infiltration of tuberculous tissue took place between them. With regard to a means of finding bacilli without having the trouble of centrifuging, it was possible to get the bacilli in direct smear from the milk in a very advanced case or in a very acute case, but centrifuging was essential in most cases and if possible the last milk or strippings from the suspected quarter should be taken for examination.

He had never used the unstained smear method in anthrax and was interested in the method of taking the blood from the foot. It had been stated that in warm climates the anthrax bacilli remained for a longer period in the bone marrow than in the blood should the animal have been dead for some time.

As for the pathogenic effects on humans of the organisms present in discharge in cases of leucorrhœa mentioned by Mr. Scott, the number and variety present in vaginal discharges was enormous and there was no doubt that infection in humans, such as alimentary and throat diseases, could occur from these. In the point raised during the demonstration by Mr. Scott of the difficulty sometimes encountered to get proper decolorisation in staining milk for tubercle, the reasons for that difficulty were the presence of fat in the smear, or, if too thick a smear of the deposit was made. A good procedure to prevent those was to take the centrifuge tube after centrifuging, heat the cream end through the Bunsen flame and then pour off the cream and milk, keeping the tube inverted so that no fat ran back on the deposit, pass the needle vertically into the tube (taking care not to touch the cream with the needle) and make as thin a smear as possible, fix by heat and proceed in the usual way.

Mr. Scott had asked how to diagnose a T.B. chronic cough. That could only be done by the history of the cough and observation of the animal, combined with clinical examination of the chest. Samples of sputum might be found on the wall in front of the cow and they should always be collected and examined for the presence of tubercle bacilli.

Mr. Green hoped that definite cells peculiar to tuberculous milks alone might be found. A definite opinion, however, could not be given in any cases without finding tubercle bacilli present, but those oval cells were certainly a guide in diagnosing a T.B. udder. He mentioned the removal of supernumerary teats in all young heifer calves with which he met, and he (Mr. Tweed) thought this was a good practice, as one saw in routine examination that those teats in dairy cows caused a considerable amount of chronic suppuration and induration of a part of the udder.

In amplifying Mr. Lloyd's remarks, the delay incurred before cows were slaughtered (when dealing with tuberculous milk under the Act) would be lessened to a great extent if part-time veterinary officers would all do their microscopic examinations themselves and save a month's delay waiting for the guinea-pig report. In regard to the serving of notices, the medical officer of health could serve a notice which lasted for twenty-four hours, stopping the use of milk for human consumption under the Milk and Dairies Order if he suspected that the milk was likely to spread infectious disease, and the five days' notice was served by an officer of the local authority on cows suffering from the diseases mentioned in his paper. That notice would no doubt be served by the veterinary officer.

In reply to Mr. Robinson's questions on anthrax bacilli in milk, he might say that it had been definitely stated by eminent authorities that anthrax bacilli were present in the milk at the time of death of the animal and that they were liable to enter the milk soon after they made their appearance in the blood. He had never examined milk from an anthrax carcase.

In regard to Mr. Woodrow's point, so far very little procedure had been carried out in country districts. They, as a profession, through their National Association, should urge the Ministry of Health further to recommend responsible authorities to do so, and also of the necessity of routine inspection of dairy herds to detect cases of tuberculosis of the udder.

The PRESIDENT proposed a vote of thanks to the essayist, which was seconded by Mr. WOODROW, and heartily carried.

The HON. SECRETARY proposed a vote of thanks to the President; Mr. FLETCHER seconded and this also was carried.

Specimens showing tuberculosis of the udder, abdominal testes in a sow and valvular disease of the heart in a two-year-old heifer were also exhibited.

J. S. LLOYD,
Hon. Secretary.

Ayrshire Division.

ANNUAL MEETING.

The Annual Meeting of the Ayrshire Division of the N.V.M.A. was held in the Ayr and Galloway Hotel, Ayr, on February 17th, 1927, the President, Mr. W. A. McGregor, Jr., presiding.

The minutes of the previous meeting having been read and adopted, the Hon. Secretary submitted the annual financial statement, which was approved.

ELECTION OF OFFICERS: On the motion of the Chairman, seconded by Mr. W. G. Forbes (Kilmarnock), *Mr. Walter Gardner* (Maybole) was unanimously elected President. On the motion of Mr. McGregor, Jr. (Ayr), seconded by Mr. H. Gillmor (Ayr), *Mr. W. G. Forbes* was elected Vice-President. The Secretary and Treasurer, *Mr. D. Brown* (Kilwinning) was re-elected.

The meeting discussed Tuberculin Testing in its various aspects, which led up to the discussion on the question of the Control of Cows Reacting to the Tuberculin Test: (*a*) Whether the time has arrived for exercising some form of control over cows that have reacted to the tuberculin test; (*b*) If so, what form that control should take.

(*Continued at foot of first column, next page.*)

NOTES AND NEWS.

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events.

Sept. 12-17th.—N.V.M.A. Congress at Torquay.
April 19th—Meeting of the Editorial Committee N.V.M.A. at 4-30 p.m.
April 29th—Meeting of the Mid-West and South Wales Division at Bath.

A Tribute from the Antipodes.

In forwarding his subscription for the year, a Christchurch (New Zealand) member, writes: "The Association is doing good work and the *Record* is a credit to it. I have much pleasure in continuing my membership."

Aged Horses.

Mr. F. Bullock, Secretary and Librarian of the R.C.V.S. has favoured us, *a propos* of the recent discussion at the Central Division meeting on Professor McCunn's specimen of the teeth of an equine "ancient," with the following extract from *The Veterinarian*, 1892, page 349, to which reference was made by Major-General Sir John Moore:—

"Aged Horses.—A correspondent writes to tell us that in the bar parlour of the Golden Lion Inn, at Newmarket, is a picture of a horse that died in its sixty-second year, while its owner, Mr. Harrison, was seventy-five. On the picture, our correspondent says, is the horse's history. This is probably the same animal as that referred to in Youatt's work on the horse. A Russian cob that had for many years done work for successive Bishops of Salisbury, died at the age of forty-eight; and it is on record that a horse, wounded at the battle of Preston in 1715, lived on till 1758."

Mr. Bullock sends the following further information:—

Extract from Youatt's "The Horse," page 146.—"Mr. Percival gives an account of a barge horse that died in his sixty-second year."

Personal.

An "International" Judge.—Mr. W. W. Reekie, M.R.C.V.S., London, has been appointed as one of the Judges in the Driving Classes at the forthcoming International Horse Show, which is held annually at Olympia. This is the second occasion on which Mr. Reekie has had the honour of this appointment.

(*Continued from previous page.*)

The feeling of the meeting was that the time was inopportune for this, because the state of agriculture was so bad that farmers could not afford it, and it was felt that it would discourage farmers voluntarily to test their animals, a thing which many were inclined to do at the present time. It was decided that something should be done to get the Government to pass legislation making it compulsory for cows to be tested, and those animals that react to be branded, with some form of compensation to assist the owners. With this end in view, tuberculin should be standardised and put under some form of control.

The members then partook of tea, at the conclusion of which, on the motion of Mr. Gardner, Mr. W. A. McGregor, Jr., was thanked for his conduct in the Chair during the year.

David Brown,
Hon. Secretary and Treasurer.

Army Veterinary Service.

London Gazette—War Office—Regular Forces.

April 5th.—The follg. Lts. on prob. to be Lts. (Sept. 15th, 1926):—A. G. Heveningham, C. U. K. Porter, I. D. Macrae, A. G. Ralston.

Ayrshire Cattle for Denmark.

The milking properties of Ayrshire cattle are commending themselves to stock-breeders in other countries. In many parts of England there are now several notable herds, and a Berkshire breeder has shipped a selection of pure-bred Ayrshires to Denmark. This is believed to be the first consignment of Ayrshires for that country, and the selected stock are to form the nucleus of a first-class herd. Hitherto the native Danish Red breed, the Friesian, and to a lesser extent the Shorthorn have held the Danish field; and, in view of the high reputation of the dairying industry in Denmark, the result of this shipment will be watched with interest.

Anthrax in the Horse.

At a recent meeting of the Perth County Executive Committee under the Diseases of Animals Acts, it was reported that during the last six months 14 cases of sheep scab had been notified; swine fever—two cases notified and none confirmed; parasitic mange—one case reported and confirmed; tuberculosis—47 cases reported and the affected animals slaughtered or disposed of; anthrax—63 cases reported and 31 confirmed.

On 19th March, it was further stated, a gelding rising three years old died suddenly in a field adjoining the farm steading of Hills of Bendochy, Coupar Angus, occupied by James Duncan Chillips. Veterinary examination certified that the case was one of suspected anthrax. The carcase was cremated and the Ministry confirmed the case. This was the first case in the county of a horse dying from the effects of anthrax.

Shire Horse Society.

At a council meeting of the Shire Horse Society, held on April 5th, the election of Mrs. Stanton as president of the Society was approved, this being the first time that a woman has occupied such a post.

The matter of the compulsory veterinary examination by an officially appointed officer before the issue of export certificates was referred to the Show Committee. The council agreed to give 100 guineas to the Royal Veterinary College Rebuilding Fund.

"Hopeless Blunder" Costs £200 Fine.

"An unusual appeal case was heard," says the *Manchester Guardian*, of April 7th, "at Durham Quarter Sessions when the Durham County Council appealed against the refusal of the Lanchester magistrates to convict John Quinn, a Quebec (Durham) farmer, for failing to notify the authorities that he had in his possession a cow which appeared to be suffering from tuberculosis.

"According to the appellants a supply of milk sent to South Shields was found to contain tubercular germs. Inquiries were instituted and a visit paid to Quinn's farm, where thirty beasts were examined. Six were segregated, and the veterinary surgeon had no doubt that one was suffering from tuberculosis.

"Quinn said there was absolutely nothing about the cow's condition to cause him to suspect that it was suffering from tuberculosis.

"Judge Greenwell said there was no doubt that Quinn knew of the condition of the cow and had committed a hopeless blunder. A fine of £200 and costs was imposed."

Epidemic among Sheep.

The Times' Duffield Correspondent informs his paper that a mysterious epidemic in the breeding flocks in the East Riding of Yorkshire is causing serious loss among ewes and lambs. Both pure bred and commercial flocks are affected. In one instance 50 ewes dropped 70 lambs and in a few days only eight lambs were living. A fellmonger received in three days 900 dead lambs.

H.M. Stationery Office Publication.

The undermentioned has been published during the week. Copies can be purchased through any bookseller, or directly from H.M. Stationery Office, at the following addresses:—London: Adastral House, Kingsway, W.C.2, and 28 Abingdon Street, S.W.1; Cardiff: 1 St. Andrew's Crescent; Manchester: York Street; Edinburgh: 120 George Street.

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Scholarships and Maintenance Grants for the sons and daughters of Agricultural Workmen and others. Scheme for establishing, Report of the Central Committee	1 3	1 4

The R.V.C. Rebuilding Fund.

"It will," says *The Times* of Tuesday last, "be gratifying to owners and lovers of animals to notice that encouraging progress is being made in raising the fund required to rebuild and equip the Royal Veterinary College, Camden Town. About a fifth of the total that has to be provided from private sources has been subscribed.

"There is probably no branch of research in which Great Britain shows to less advantage than the veterinary. This is due entirely, strange as it may seem in the case of a country that has won world-wide fame for its animals, to a failure to appreciate the supreme importance of looking after the health and welfare of our farm and other animals. The value and national importance of our farm stock alone would justify the expenditure of the sum required many times over. It is a matter for the attention of consumers, as well as of producers, of agricultural commodities that the annual output of animals and animal products—including poultry—is of the value of £154,650,000. It is surely something to the nation that so important a source of wealth should receive recognition, in a way vital to its health and endurance."

Doctors in Irish Free State.

"Immediately after Easter," says the Dublin Correspondent of *The Times*, "a Bill will be introduced in Dail Eireann to provide for the establishment of a separate Medical Register for the Irish Free State.

"The existing partnership with the British Medical Council will be continued, but a separate register will be established in Ireland, and every medical practitioner in the Free State will be compelled to have his name inscribed on it. The effect of the change will be that while to all intents and purposes the regulations of the General Medical Council will continue to govern the medical profession in this country, the Free State Medical Council will have disciplinary powers in regard to its own members. The Bill represents a compromise between those who desired to retain the old system without any change and the advocates of a totally distinct medical register for the Free State. Every doctor whose name appears on the General Medical Register will be qualified to practise in the Free State on condition that he pays a registration fee. In other respects there will be no essential departure from the existing system."

On the recommendation of the Aberystwyth Sanitary Committee, Mr. Albert Parry, M.R.C.V.S., was, at a meeting of the Town Council, appointed Meat Inspector for the district at a salary of £75 per annum, provided the Ministry of Health were prepared to pay half the salary. Replying to a member who remarked that people slaughtered animals now wherever they liked, the Chairman said that in future they would have to give three hours' notice to the Inspector before they could slaughter.

Danger of Green Bone to Poultry.

"The Ministry of Agriculture has issued a warning to poultry-keepers who keep other livestock of the danger of foot-and-mouth disease being conveyed to their animals by contact with crushed green bones, which are used for feeding poultry. The new Order of the Ministry, which requires the boiling of any animal foodstuff derived from any part of the carcase of an animal before it is used for feeding animals, or brought into contact with animals, does not prohibit the feeding of green bones to poultry, as poultry are not animals within the meaning of the Orders relating to foot-and-mouth disease. Bone marrow is, however, a dangerous medium of contagion, and poultry-keepers who own cattle, sheep, goats, or swine are responsible under the Order for ensuring that no green bones used by them for feeding poultry are brought into contact with animals, or kept in any place where animals can possible have access to them.

"The Ministry's warning has occasioned some surprise among poultry-keepers, since it is the first intimation of danger arising from this source, and the view is expressed that farmers who would go to the trouble to provide green bone for their poultry would be unlikely to let other stock come in contact with it. Green bone is not so commonly used by farmers as by town poultry-keepers because of the difficulty in obtaining fresh supplies; and, in view of this warning, owners of four-footed stock will do better to rely upon good samples of meat-meal or fish-meal to supply the nitrogenous portion of the diet for poultry."—*The Times.*

CORRESPONDENCE.

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.

All correspondence must bear the name and address of the contributor for publication.

The Editor does not hold himself responsible for the opinions of his correspondents.

The Benevolent Fund Aid Performance.

To the Editor of The Veterinary Record.

Sir,—May I again borrow space in the *Veterinary Record* to express my very grateful thanks to all those who supported the recent production of "The Rotters" in aid of the Victoria Veterinary Benevolent Fund. The support I received from so many people makes it almost a physical impossibility to express my gratitude to them individually, and I trust that at any rate the members of the profession who read this will take this as my personal thanks.

I hope, within a fortnight, to be able to state in your columns the exact amount that will be handed over to the fund, but in any case, as I announced at the end of the performance, it will not be less than £125.—Yours faithfully, P. J. Simpson.

Maidenhead,
April 11th, 1927.

The Editor acknowledges the receipt of the following:—
Communications from Mr. G. F. Boddie, Dr. G. W. Clough.

National Veterinary Medical Association of Great Britain and Ireland.

EDITORIAL OFFICE: 10 Gray's Inn Square, London W.C.1.

All communications relative to the literary side of the Veterinary Record must be addressed to the Assistant Editor, "Veterinary Record," 10 Gray's Inn Square, W.C.1